VOLUME 22 / NUMBER 20
OCTOBER 23, 1984
ACC. NOS. N84-29847 TO N84-31084

astro

NOV 2 0 [illegible]

of [illegible]
Ast[illegible]y
[illegible]

ROO[illegible] [illegible] ONLY

ASTRONOMY
TL
501
S42
V.22
No20

STAR

AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts.*

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 22, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

The University
of Michigan
Astronomy
Library

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche[1] are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

---

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subecription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vi.

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN: An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in *Star*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols # and * from ESA - Information Retrieval Service European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

FEDERAL DEPOSITORY LIBRARY PROGRAM

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 50 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. Over 1,300 other depositories also exist. A list of the regional GPO libraries appears on the inside back cover of *STAR*.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International, Ltd.
1495 Chain Bridge Road
McLean, Virginia 22101

ESDU International, Ltd.
251-259 Regent Street
London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-1)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	–1	–2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50

E-99 - Write for quote

N01	35.00	45.00

VOLUME 22 NUMBER 20/OCTOBER 23, 1984

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 3125

02 AERODYNAMICS 3125

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 3127

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 3127

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 3128

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION 3129

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER 3130

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL 3131

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 3132

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 3133

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS 3133

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) N.A.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES 3133

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 3134

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING N.A.

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 3135

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER 3135

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 3145
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 3145
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 3147
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 3152
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 3161
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 3165
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.

For related information see also *Physics.*

31 ENGINEERING (GENERAL) 3168
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 3172
Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 3177
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuity.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 3182
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 3189
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 3192
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 3195
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 3199
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 3200
Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.

For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 3205

43 EARTH RESOURCES 3227
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 3234
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 3238
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 3239
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 3245
Includes weather forecasting and modification.

48 OCEANOGRAPHY 3250
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) 3252
Includes genetics.

52 AEROSPACE MEDICINE 3259
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES 3262
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT 3263
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY N.A.
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) N.A.

60 COMPUTER OPERATIONS AND HARDWARE 3266
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE 3268
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS 3277
Includes computer networks.

63 CYBERNETICS 3278
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS 3279
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 3283
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS 3284
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS N.A.
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) 3284
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS 3290
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS 3292
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS 3298
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS 3299
Includes light phenomena.

75 PLASMA PHYSICS 3301
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS 3308
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS 3312
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) 3312
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 3312
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 3314

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS 3318

Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE 3318

Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION 3318

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) N.A.

89 ASTRONOMY 3319

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 3319

Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 3319

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS 3319

Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 3320

Includes cosmic radiation; and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

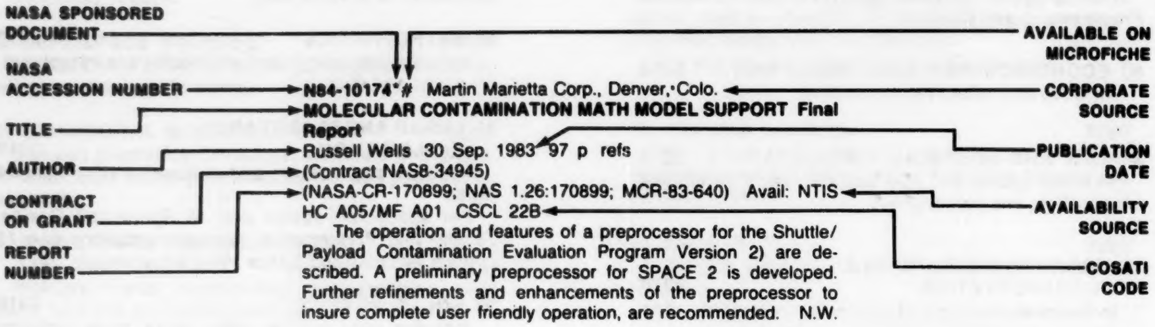
GENERAL

99 GENERAL 3321

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX I-1
PERSONAL AUTHOR INDEX I-71
CORPORATE SOURCE INDEX I-81
CONTRACT NUMBER INDEX I-97
REPORT/ACCESSION NUMBER INDEX I-101

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHOR
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE

N84-10174*# Martin Marietta Corp., Denver, Colo.
MOLECULAR CONTAMINATION MATH MODEL SUPPORT Final Report
Russell Wells 30 Sep. 1983 97 p refs
(Contract NAS8-34945)
(NASA-CR-170899; NAS 1.26:170899; MCR-83-640) Avail: NTIS
HC A05/MF A01 CSCL 22B

The operation and features of a preprocessor for the Shuttle/Payload Contamination Evaluation Program Version 2) are described. A preliminary preprocessor for SPACE 2 is developed. Further refinements and enhancements of the preprocessor to insure complete user friendly operation, are recommended. N.W.

VOLUME 22 NUMBER 20/OCTOBER 23, 1984

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N84-29847*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOME AERODYNAMIC DISCOVERIES AND RELATED NACA/NASA RESEARCH PROGRAMS FOLLOWING WORLD WAR 2
M. Leroy Spearman Jun. 1984 28 p refs
(NASA-TM-86258; NAS 1.15:86258) Avail: NTIS HC A03/MF A01 CSCL 01B

The World War 2 time period ushered in a new era in aeronautical research and development. The air conflict during the war highlighted the need of aircraft with agility, high speed, long range, large payload capability, and in addition, introduced a new concept in air warfare through the use of guided missiles. Following the war, the influx of foreign technology, primarily German, led to rapid advances in jet propulsion and speed, and a host of new problem areas associated with high-speed flight designs were revealed. The resolution of these problems led to a rash of new design concepts and many of the lessons learned, in principle, are still effective today. In addition to the technical lessons learned related to aircraft development programs, it might also be noted that some lessons involving the political and philosophical nature of aircraft development programs are worth attention. Author

N84-29848# Bell Telephone Labs., Inc., Greensboro, N. C. Federal Systems Div.
STUDY OF THE FAA (FEDERAL AVIATION ADMINISTRATION) PROGRAM TO MODERNIZE MAINTENANCE OPERATIONS Engineering Report, Oct. 1983 - Apr. 1984
P. F. Sennewald, H. W. Gustafson, and P. B. Taylor Washington, D.C. FAA May 1984 60 p
(Contract DTFA01-84-C-0010)
(AD-A142295; DOT/FAA/ES-83/12) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report is an evaluation of the FAA's program to modernize the National Airspace System and reduce maintenance and operation costs through replacement of present systems with state-of-the-art equipment, centralization of the maintenance work force and remote monitoring of equipment/facilities. A conclusion of the study was the FAA's Maintenance Program which is a viable approach to meeting these goals. The AT&T study team made seven recommendations they believed would ensure improved productivity and reduced operating costs. The objectives of the AT&T study were to evaluate the FAA's modernization program, and then, based on AT&T's experience in their modernization effort, make recommendations to improve the FAA's program. The recommendations can be generalized into three areas which are: (1) Separate the monitoring and control of facilities from the automation and centralization of operations, thereby enabling independent efforts in those areas, (2) Establish an overall program management plan, and (3) Establish a model for centralization of the work force in the automated environment. Author (GRA)

N84-29849# Air Force Academy, Colo. Dept. of Aeronautics.
AIR FORCE ACADEMY AERONAUTICS DIGEST Final Report
J. DeJongh, ed., W. Heiser, ed., and R. Hogge, ed. Mar. 1984 176 p
(AD-A142399; USAFA-TR-84-5) Avail: NTIS HC A09/MF A01 CSCL 20/4

Contents: External Flow-Field Measurements on a Top-Mounted, Inlet-Vatol Configuration at High Angles of Attack; Experimental Measurements of Wake Characteristics of Low Aspect-Ratio Delta and Flapped-Plate Planforms; The Early Days of Aeronautics; Uncertainty Analysis: A New Computer Subroutine; One-Dimensional Unsteady Isentropic Gas Flow; The Myth of Objectivity in the Writing of Engineers. GRA

N84-29850# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN, NO. 1984-1, 218/ JANUARY - FEBRUARY
Claude Sevestre, ed. Paris ESA Jun. 1984 81 p refs Transl. by ONERA into ENGLISH of La Rech. Aerospatiale, Bull. Bimestrial (Paris), No. 1984-1/218, Jan. - Feb. 1984 81 p
(ESA-TT-858) Avail: NTIS HC A05/MF A01; print copy in ENGLISH available at ONERA, FF 60; original report in FRENCH available at ONERA Paris FF 60

Numerical simulation of homogeneous, isotropic, two-dimensional turbulence in compressible flow; a semi-implicit and unsteady numerical method of viscous-inviscid interaction for transonic separated flows; experimental determination of the response of a solid propellant to high-frequency pressure oscillations; blade bending flutter in supersonic flow; and skin friction measurements with hot-element gages are discussed. Author (ESA)

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N84-29851*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
IMPLEMENTATION OF UNIFORM PERTURBATION METHOD FOR POTENTIAL FLOW PAST AXISYMMETRIC AND TWO-DIMENSIONAL BODIES Progress Report, period ending 31 May 1984
T. C. Wong and S. N. Tiwari Aug. 1984 152 p refs
(Grant NCC1-65)
(NASA-CR-173829; NAS 1.26:173829) Avail: NTIS HC A08/MF A01 CSCL 01A

The aerodynamic characteristics of potential flow past an axisymmetric slender body and a thin airfoil are calculated using a uniform perturbation analysis method. The method is based on the superposition of potentials of point singularities distributed inside the body. The strength distribution satisfies a linear integral equation by enforcing the flow tangency condition on the surface of the body. The complete uniform asymptotic expansion of its solution is obtained with respect to the slenderness ratio by modifying and adapting an existing technique. Results calculated by the perturbation analysis method are compared with the existing surface singularity panel method and some available analytical solutions for a number of cases under identical conditions. From these comparisons, it is found that the perturbation analysis method can provide quite accurate results for bodies with small slenderness ratio. The present method is much simpler and requires less memory and computation time than existing surface singularity panel methods of comparable accuracy. Author

N84-29852*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ACCELERATION TO A STEADY STATE FOR THE EULER EQUATIONS Final Report
Eli Turkel Jul. 1984 47 p refs
(Contracts NAS1-16394; NAS1-17130)
(NASA-CR-172398; NAS 1.26:172398; ICASE-84-32) Avail: NTIS HC A03/MF A01 CSCL 01A

A multi-stage Runge-Kutta method is analyzed for solving the Euler equations exterior to an airfoil. Highly subsonic, transonic and supersonic flows are evaluated. Various techniques for accelerating the convergence to a steady state are introduced and analyzed. Author

N84-29853*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
INTERFERENCE DRAG IN A SIMULATED WING-FUSELAGE JUNCTURE Final Report
L. R. Kubendran, H. McMahon, and J. Hubbartt Washington NASA Jul. 1984 60 p refs
(Grant NAG1-306)
(NASA-CR-3811; NAS 1.26:3811) Avail: NTIS HC A04/MF A01 CSCL 01A

The interference drag in a wing fuselage juncture as simulated by a flat plate and a body of constant thickness having a 1.5:1 elliptical leading edge is evaluated experimentally. The experimental measurements consist of mean velocity data taken with a hot wire at a streamwise location corresponding to 16 body widths downstream of the body leading edge. From these data, the interference drag is determined by calculating the total momentum deficit (momentum area) in the juncture and also in the two dimensional turbulent boundary layers on the flat plate and body at locations sufficiently far from the juncture flow effect. The interference drag caused by the juncture drag as measured at this particular streamwise station is -3% of the total drag due to the flat plate and body boundary layers in isolation. If the body is considered to be a wing having a chord and span equal to 16 body widths, the interference drag due to the juncture is only -1% of the frictional drag of one surface of such a wing. Author

N84-29854*# National Aeronautics and Space Administration, Washington, D. C.
ANALYSIS OF AIRFOIL TRANSITIONAL SEPARATION BUBBLES Final Report
R. L. Davis and J. E. Carter Washington NASA Jul. 1984 72 p refs
(Contract NAS1-16585)
(NASA-CR-3791; NAS 1.26:3791) Avail: NTIS HC A04/MF A01 CSCL 01A

A previously developed local inviscid-viscous interaction technique for the analysis of airfoil transitional separation bubbles, ALESEP (Airfoil Leading Edge Separation) has been modified to utilize a more accurate windward finite difference procedure in the reversed flow region, and a natural transition/turbulence model has been incorporated for the prediction of transition within the separation bubble. Numerous calculations and experimental comparisons are presented to demonstrate the effects of the windward differencing scheme and the natural transition/turbulence model. Grid sensitivity and convergence capabilities of this inviscid-viscous interaction technique are briefly addressed. A major contribution of this report is that with the use of windward differencing, a second, counter-rotating eddy has been found to exist in the wall layer of the primary separation bubble. Author

N84-29855# National Aeronautical Establishment, Ottawa (Ontario). Flight Research Lab.
THEORETICAL AND MEASURED AIRFLOW ABOUT THE TWIN OTTER WING Aeronautical Note
A. M. Drummond and J. I. MacPherson Mar. 1984 42 p
(AD-A141974; NAE-AN-19; NRC-33184) Avail: NTIS HC A03/MF A01 CSCL 20/4

The NAE Twin Otter atmospheric research aircraft carries instruments mounted under the wings to count and image cloud and precipitation particles for cloud physics studies. As part of an investigation on the influence of the aircraft presence on these measurements, airflow velocities about the wing have been calculated. These theoretical results have been compared with in-flight measurements taken by pressure probes mounted in a cannister suspended from a long and a short pylon below the wing at two spanwise locations. The Twin Otter wing has been represented by a Joukowski aerofoil of the same maximum thickness but with a cusped trailing edge. The wing camber has been neglected but aspect ratio and planform effects have been included. The effect of the cannister was included in the comparison of theory with experiment. Use of theory aft of the quarter chord will require experimental verification. Both experimental and theoretical results for the local flow velocity ratio are linear functions of aircraft lift coefficient (CL) in the range of Cl between 0.35 to 1.06. The worst discrepancy between theory and experiment in the CL range of 0.4 to 0.6 is -2.8% to +1.1%. The results for the inboard/long pylon and outboard/short pylon have considerably less deviation. The theory has been experimentally verified to the above accuracy and can be used to describe the spatial variation of the flow velocity ahead of the wing. Applications of the theory to the study of aircraft flow effects on cloud physics measurements can proceed with a quantifiable level of confidence. Author (GRA)

N84-29856# Dayton Univ., Ohio. Research Inst.
THRUST AUGMENTATION STUDY OF HIGH PERFORMANCE EJECTORS Final Report, 15 Mar. 1982 - 15 Mar. 1983
J. E. Minardi and H. P. VonOhain Wright-Patterson AFB, Ohio AFWAL Nov. 1983 88 p
(Contract F33615-82-K-3016)
(AD-A142650; UDR-TR-83-37; AFWAL-TR-83-3087) Avail: NTIS HC A05/MF A01 CSCL 20/4

A technique is developed for determining a representative value of the maximum efficiency that can be achieved with high performance ejectors when operating on the supersonic solution branch of an ejector. These efficiencies are used to calculate thrust augmentation for an ejector over a wide range of parameters including operation with a hypothetical engine. Reasonable values of thrust augmentation can be achieved at low subsonic flight Mach numbers. However, at flight Mach numbers near one, little or no thrust augmentation was found. At supersonic flight Mach numbers, thrust augmentation was achieved. Basic studies indicated that the effects of temperature was opposite at subsonic and supersonic flight Mach numbers. Thrust augmentation decreased with increasing temperature at subsonic Mach number sand increased with increasing temperature at supersonic Mach numbers. GRA

N84-30115# Chiba Univ. (Japan). Dept. of Mechanical Engineering.
RANDOM-CHOICE SOLUTIONS FOR TWO-DIMENSIONAL AND AXISYMMETRIC SUPERSONIC FLOWS
H. Honma, M. Wada, and K. Inomata *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 3-14 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N84-29857*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A METHOD FOR THREE-DIMENSIONAL MODELING OF WIND-SHEAR ENVIRONMENTS FOR FLIGHT SIMULATOR APPLICATIONS
Richard S. Bray Jul. 1984 17 p refs
(NASA-TM-85969; A-9777; NAS 1.15:85969) Avail: NTIS HC A02/MF A01 CSCL 01C

A computational method for modeling severe wind shears of the type that have been documented during severe convective atmospheric conditions is offered for use in research and training flight simulation. The procedure was developed with the objectives of operational flexibility and minimum computer load. From one to five, simple down burst wind models can be configured and located to produce the wind field desired for specific simulated flight scenarios. A definition of related turbulence parameters is offered as an additional product of the computations. The use of the method to model several documented examples of severe wind shear is demonstrated. Author

N84-29858# General Accounting Office, Washington, D. C. Resources, Community, and Economic Development Div.
THE CHANGING AIRLINE INDUSTRY: A STATUS REPORT THROUGH 1982
6 Jul. 1983 34 p
(GAO/RCED-83-179; B-197119) Avail: NTIS HC A03/MF A01

Changes in airline traffic, fares, profits, productivity, and air service patterns are discussed for the first 5 years after deregulation. It is shown that in 1982 air fares fell below 1981 levels, while costs increased slightly. In addition, air traffic, weekly departures, available seats, and load factors all turned upward. The airline industry's return on investment, however, continued the decline started in 1979. There was no evidence that deregulation adversely affected air safety in 1979, 1980, or 1981. Air traffic safety statistics for 1982 indicate a lower overall accident rate for certificated airlines, but two major fatal accidents that year raised the 1982 fatality rate significantly above that of 1981. A.R.H.

N84-29859# National Bureau of Standards, Washington, D.C. National Engineering Lab.
DECISION ANALYSIS MODEL FOR PASSENGER-AIRCRAFT FIRE SAFETY WITH APPLICATION TO FIRE-BLOCKING OF SEATS Interim Report, Nov. 1982 - Dec. 1983
J. R. Hall, Jr. and S. W. Stiefel Atlantic City, N.J. FAA Apr. 1984 104 p
(Contract DTFA30-83-A-0034)
(AD-A142477; NBSIR-84-2817; DOT/FAA/CT-84/8) Avail: NTIS HC A06/MF A01 CSCL 01/2

This report develops a generic model for analysis of the costs and benefits of fire-risk reducing strategies related to passenger airlines. The model calculates incremental costs for installing and operating these options. It also calculates estimated lives saved and property damage avoided, and it provides rules for combining costs and benefits into a single measure of attractiveness for an alternative. This model is then applied to the strategy of fire-blocking seats on passenger airlines, either on U.S. airlines or on all world airlines. Author (GRA)

N84-29941# Universal Propulsion Co., Phoenix, Ariz.
HISTORY OF AIRCRAFT ESCAPE SYSTEM PROPULSION
R. F. Sadler and E. B. Skinner (Talley Industries of Arizona, Inc.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 11-20 (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 01/3

N84-29942# Douglas Aircraft Co., Inc., Long Beach, Calif. Special Products Engineering.
PROPULSION IN A LIFE-SAVING ROLE FOR ACES 2
R. G. McIntyre *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 21-32 (For primary document see N84-29939 20-20)
(Contract F33657-72-C-0379)
Avail: NTIS HC A15/MF A01 CSCL 01/3

N84-29943# Stencel Aero Engineering Corp., Arden, N.C.
THE STENCEL S4S EJECTION SEAT: A STUDY IN NEW PYROTECHNIC DEVELOPMENTS
M. A. A. Hobbs *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 33-42 (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 01/3

N84-29944# Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio. CREST Advanced Development Program Office.
CREST: CREW ESCAPE TECHNOLOGIES FOR THE 1990'S
A. M. Higgins and E. O. Roberts *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 43-48 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 01/3

N84-29945# Atlantic Research Corp., Gainesville, Va.
ENERGY MANAGEMENT FOR CREW ESCAPE SYSTEMS
M. G. Hubbell, C. W. Anderson, and W. H. Sargent *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 49-58 refs (For primary document see N84-29939 20-20)
(Contract F33615-83-C-3401)
Avail: NTIS HC A15/MF A01 CSCL 01/3

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N84-29860# Institute for Defense Analyses, Alexandria, Va. Science and Technology Div.
AN/APN-128 LIGHTWEIGHT DOPPLER NAVIGATION SYSTEM (LDNS) CASE STUDY REPORT (IDA/OSD R AND M (INSTITUTE FOR DEFENSE ANALYSES/OFFICE OF THE SECRETARY OF DEFENSE RELIABILITY AND MAINTAINABILITY) STUDY Final Report, Jul. 1982 - Aug. 1983
P. F. Goree Aug. 1983 185 p
(Contract MDA903-79-C-0018)
(AD-A142072; AD-E500641; IDA-D-23; IDA/HQ-83-25935) Avail: NTIS HC A09/MF A01 CSCL 17/7

This document records the activities and presents the findings of the AN/APN-128 Lightweight Doppler Navigation System (LDNS) Case Study Working Group, part of the IDA/OSD Reliability and Maintainability Study conducted during the period from July 1982 through August 1983. GRA

N84-29861# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
FAA (FEDERAL AVIATION ADMINISTRATION) AIR TRAFFIC ACTIVITY FY 1983 Report, 1 Oct. 1982 - 30 Sep. 1983
N. Trembley 30 Sep. 1983 219 p
(AD-A142493) Avail: NTIS HC A10/MF A01 CSCL 17/7

This report furnishes terminal and en route air traffic activity information of the National Airspace System. The data have been reported by the FAA-operated Airport Traffic Control Towers (ATCTs), Air Route Traffic Control Centers (ARTCCs), Flight Service

Stations (FSSs), International Flight Service Stations (IFSSs), and Approach Control Facilities. GRA

N84-29862# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Anthropotechnik und Simulation.
DEFINITION AND LAYOUT OF A TRAFFIC GENERATOR FOR AN AIR TRAFFIC CONTROL SIMULATION
Dietmar Dippe and Josef Thomas Mar. 1984 86 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-888)
(DFVLR-FB-84-15; ESA-TT-888) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 29

An air traffic generator was developed and implemented as a computer program which produces realistic traffic samples. The concept is based on the analysis of real air traffic control (ATC) structures and traffic flows. In a Monte Carlo traffic generation process, statistically varied traffic samples are computed as a function of user selectable characteristics of a given scenario. The resultant flight plans and initial states for individual aircraft are directly used to drive a real time ATC simulation. The computation process is illustrated for a typical application. Author (ESA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-29863*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT CHARACTERISTICS OF A MANNED, LOW-SPEED, CONTROLLED DEEP STALL VEHICLE Final Report
Alex G. Sim Aug. 1984 10 p refs Presented at the AIAA Atmospheric Flight Mech. Conf., Seattle, 21-23 Aug. 1984
(NASA-TM-86041; H-1242; NAS 1.15:86041) Avail: NTIS HC A02/MF A01 CSCL 01C

A successful manned, low speed, controlled deep stall flight research program was conducted at NASA Ames Research Center's Dryden Flight Research Facility. Piloting techniques were established that enabled the pilot to attain and stabilize on an angle of attack in the 30 deg to 72 deg range. A flight determined aerodynamic data base was established for angles of attack as high as 72 deg. Poor lateral directional flying qualities were encountered at angles of attack above 60 deg. Insight into the high angle of attack lateral directional dynamics was gained through a basic root locus analysis. Author

N84-29864*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FIELD REPAIR OF AH-16 HELICOPTER WINDOW CUTTING ASSEMBLIES
Laurence J. Bement May 1984 24 p
(NASA-TM-85831; NAS 1.15:85831) Avail: NTIS HC A02/MF A01 CSCL 01C

The U.S. Army uses explosively actuated window cutting assemblies to provide emergency crew ground egress. Gaps between the system's explosive cords and acrylic windows caused a concern about functional reliability for a fleet of several hundred aircraft. A field repair method, using room temperature vulcanizing silicone compound (RTV), was developed and demonstrated to fill gaps as large as 0.250 inch. Author

N84-29865# General Dynamics Corp., Fort Worth, Tex.
DURABILITY METHODS DEVELOPMENT, VOLUME 7 Final Report, Jun. 1979 - Jan. 1984
S. D. Manning, S. M. Speaker, D. E. Gordon, J. N. Yang (George Washington Univ., Washington, D.C.), and M. Shinozuka (Modern Analysis, Inc., Ridgewood, N.J.) Wright-Patterson AFB, Ohio AFFDL Jan. 1984 222 p
(Contract F33615-77-C-3123)
(AD-A142400; AFFDL-TR-79-3118-Vol-7) Avail: NTIS HC A10/MF A01 CSCL 20/11

A statistically-based durability analysis methodology is evaluated, refined and demonstrated in this report for advanced metallic airframes. This methodology can be used to: (1) analytically assure the U.S. Air Force's durability design requirements, (2) evaluate durability design tradeoffs, and (3) evaluate structural maintenance requirements and user options affecting life-cycle costs. The methodology accounts for initial fatigue quality, crack growth accumulation in a population of structural details, load spectra and structural properties. Analytical procedures and guidelines are developed and described for quantifying the extent of damage due to fatigue cracking in structural details as a function of service time and design variables. An initial fatigue quality model is described and discussed. This model is based on the time-to-crack-initiation (TTCI) and the equivalent initial flaw size (EIFS) concepts and a deterministic crack growth power law. An experimental test program and the resulting fractographic data for cracks in clearance-fit fastener holes are described and discussed. GRA

N84-29866# General Dynamics Corp., Fort Worth, Tex.
USAF DURABILITY DESIGN HANDBOOK: GUIDELINES FOR THE ANALYSIS AND DESIGN OF DURABLE AIRCRAFT STRUCTURES Final Report, Jul. 1981 - Jan. 1984
S. D. Manning, J. N. Yang (George Washington Univ., Washington, D.C.), and M. Shinozuka (Modern Analysis, Inc., Ridgewood, N.J.) Wright-Patterson AFB, Ohio AFWAL Jan. 1984 212 p
(Contract F33615-77-C-3123)
(AD-A142424; AFWAL-TR-83-3027) Avail: NTIS HC A10/MF A01 CSCL 01/3

This is the first edition of the Durability Design Handbook. Objectives of the handbook are: (1) summarize and interpret the essential U.S. Air Force Durability Design requirements for metallic airframes, (2) provide durability analysis criteria for economic life and durability critical parts, (3) provide state-of-the-art durability analysis concepts and methods for quantifying the extent of damage for a population of details (e.g., fastener holes, fillets, cutouts, lugs, etc.) as a function of time, and (4) provide guidelines and design data for implementing the durability methodology and for assisting contractor and USAF personnel in complying with the intent of the durability specifications for metallic airframes. This document, loosely called a Handbook, provides guidelines, concepts, analytical tools and the framework for incorporating future durability methodology advancements and design data. GRA

N84-29867# Air Force Systems Command, Eglin AFB, Fla.
WEAPONS FILE
L. Deibler and L. Roesler 1984 96 p Supersedes AD-A126656
(AD-A142508; AD-E800952) Avail: NTIS HC A05/MF A01 CSCL 15/3

This Weapons File has been prepared by AD/XRP to provide unclassified technical data on air launched weapons and munitions. The file is broken into four major categories: Air-to-Air Missiles, Guided Weapons, Unguided Weapons and Submunitions. A more detailed classified Weapons Catalogue is also available which provides performance data. The data under AIRCRAFT indicates a typical loadout as configured for the Nonnuclear Armament Plan (NAP). This file has been computerized for easy updating and it is our intent to expand and update this file on an annual basis; therefore, your comments on improvements would be appreciated, and should be directed to Mr. Larry Roesler or Mr. Lynn Deibler, AD/XRPT, Eglin AFB, FL 32542. GRA

N84-29868# Simula, Inc., Tempe, Ariz.
DESIGN AND DEVELOPMENT OF AN AUTOMATICALLY CONTROLLED VARIABLE-LOAD ENERGY ABSORBER Final Report
J. C. Warrick and J. W. Coltman Mar. 1984 71 p
(Contract N62269-82-C-0254)
(AD-A142683; TR-83-423; NADC-82025-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

The feasibility of an automatically controlled variable-load hydraulic energy absorber for use in crashworthy seating systems was investigated. In contrast to other systems, this model contained an acceleration-sensing device capable of automatic control to compensate for difference in occupant weight. A series of dynamic crash tests were performed in which the hardware successfully decelerated weights representing those of the 5th- through 95th-percentile occupants to a predetermined constant acceleration. The system was also prepared to a previously developed variable-load energy absorber system in terms of size, weight, cost, reliability, and accuracy. The program concluded that the automatically controlled variable-load energy absorber is capable of providing a predetermined constant deceleration, but recommends further testing with human surrogates to verify the capability of properly protecting human occupants from spinal injury. GRA

N84-29869# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

IMPROVED PILOT MODEL FOR APPLICATION TO A COMPUTER FLIGHT TESTING PROGRAM FOR HELICOPTERS

H. Haverdings 26 Aug. 1983 31 p refs Presented at 9th European Rotorcraft Forum, Stress, Italy, 13-15 Sep. 1983 Sponsored by Royal Netherlands Air Force Directorate of Material Air

(NLR-MP-83052-U) Avail: NTIS HC A03/MF A01

A computer flight testing program for evaluation of helicopter dynamics and handling and control qualities was developed. A control model to fly the mathematical helicopter model was designed for maneuvering flight. The model was refined to improve controllability so as to be able to keep state variable deviations small during a maneuver. This required augmentation of the cost function (to be optimized) by specifying weighting terms on control rate and on the control and the state as well. Terminal conditions have to be met approximately, rather than exactly, so as to eliminate the problem of the pilot's feedback gains becoming infinitely large. Results of an application for a landing flare with an S-61 class helicopter are shown. Author (ESA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N84-29870*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPARISON OF ICING CLOUD INSTRUMENTS FOR 1982-1983 ICING SEASON FLIGHT PROGRAM

Robert F. Ide and G. Paul Richter 1984 26 p refs Presented at the 22nd Aerospace Sci. Meeting, Reno, Nev., 9-12 Jan. 1984; sponsored by the American Inst. of Aeronautics and Astronautics Prepared in cooperation with Army Research and Technology Labs.

(NASA-TM-83569; E-1950; NAS 1.15:83569; USAAVSCOM-TR-84-C-1) Avail: NTIS HC A03/MF A01 CSCL 01D

A number of modern and old style liquid water content (LWC) and droplet sizing instruments were mounted on a DeHavilland DHC-6 Twin Otter and operated in natural icing clouds in order to determine their comparative operating characteristics and their limitations over a broad range of conditions. The evaluation period occurred during the 1982-1983 icing season from January to March 1983. Time histories of all instrument outputs were plotted and analyzed to assess instrument repeatability and reliability. Scatter plots were also generated for comparison of instruments. The measured LWC from four instruments differed by as much as 20 percent. The measured droplet size from two instruments differed by an average of three microns. The overall effort demonstrated the need for additional data, and for some means of calibrating these instruments to known standards. Author

N84-29871*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

USER'S MANUAL FOR A FUEL-CONSERVATIVE DESCENT PLANNING ALGORITHM IMPLEMENTED ON A SMALL PROGRAMMABLE CALCULATOR

Dan D. Vicroy 1984 58 p refs

(NASA-TM-86275; NAS 1.15:86275) Avail: NTIS HC A04/MF A01 CSCL 01D

A simplified flight management descent algorithm was developed and programmed on a small programmable calculator. It was designed to aid the pilot in planning and executing a fuel conservative descent to arrive at a metering fix at a time designated by the air traffic control system. The algorithm may also be used for planning fuel conservative descents when time is not a consideration. The descent path was calculated for a constant Mach/airspeed schedule from linear approximations of airplane performance with considerations given for gross weight, wind, and nonstandard temperature effects. An explanation and examples of how the algorithm is used, as well as a detailed flow chart and listing of the algorithm are contained. Author

N84-29872# Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio.

HORIZONTAL DIPLOPIA THRESHOLDS FOR HEAD-UP DISPLAYS Final Report

R. Warren, L. V. Genco, and T. R. Connon Apr. 1984 47 p

(AD-A141965; AFAMRL-TR-84-018) Avail: NTIS HC A03/MF A01 CSCL 06/16

Horizontal diplopia thresholds were determined using a Head-Up Display (HUD) emulator which superimposed a small vertical line at various degrees of binocular disparity on a rich outdoor scene. The main findings are that observers are more intolerant of negative disparity than positive disparity. In negative disparity, a non-fixated object is optically further than a fixated object. For 32 observers, the overall median negative disparity threshold was 1.2 mrad and the overall median positive disparity threshold was 2.6 mrad. Assuming that pilots fixate on external targets, these results suggest that HUD imagery should be placed at a slightly nearer optical distance than background targets. The results also indicate that: (1) longer viewing is more likely to lead to a diplopia effect than short glances, (2) resistance to diplopia appears to be an individual trait, and (3) a large proportion of responses involve suppression of the image in one eye. The report also includes a table of the percentage of observers reporting diplopia as a function of disparity magnitude. This table may be used to predict the incidence rate of diplopia among pilots for any allowed degree of disparity. Author (GRA)

N84-29873# Institute for Defense Analyses, Alexandria, Va. Science and Technology Div.

F-15 AN/APG-63 RADAR CASE STUDY REPORT IDA/OSD R AND M (INSTITUTE FOR DEFENSE ANALYSES/OFFICE OF THE SECRETARY OF DEFENSE RELIABILITY AND MAINTAINABILITY) STUDY Final Report, Jul. 1982 - Aug. 1983

P. F. Goree Aug. 1983 315 p

(Contract MDA903-79-C-0018)

(AD-A142071; AD-E500640; IDA-D-19; IDA/HQ-83-25894) Avail: NTIS HC A14/MF A01 CSCL 17/9

This document records the activities and presents the findings of the F-15 AN/APG-63 Radar Case Study Working Group, part of the IDA/OSD Reliability and Maintainability Study, conducted during the period from July 1982 through August 1983. GRA

N84-29874# Institute for Defense Analyses, Alexandria, Va.

F-16 APG-66 FIRE CONTROL RADAR CASE STUDY REPORT IDA/OSD R AND M (INSTITUTE FOR DEFENSE ANALYSES/ OFFICE OF THE SECRETARY OF DEFENSE RELIABILITY AND MAINTAINABILITY) STUDY Final Report, Jul. 1982 - Aug. 1983

P. F. Goree Aug. 1983 252 p
(Contract MDA903-79-C-0018)
(AD-A142075; AD-E500654; IDA-D-21; IDA/HQ-83-25895) Avail: NTIS HC A12/MF A01 CSCL 19/5

This document records the activities and presents the findings of the F-16 APG-66 Fire Control Radar Case Study Working Group, part of the IDA/OSD Reliability and Maintainability Study, conducted during the period from July 1982 through August 1983. GRA

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-29875*# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
PURDU-WINCOF: A COMPUTER CODE FOR ESTABLISHING THE PERFORMANCE OF A FAN-COMPRESSOR UNIT WITH WATER INGESTION Final Report
M. Leonardo, T. Tsuchiya, and S. N. B. Murthy Jan. 1982 292 p refs
(Grant NAG3-204)
(NASA-CR-168005; NAS 1.26:168005) Avail: NTIS HC A13/MF A01 CSCL 21E

A model for predicting the performance of a multi-spool axial-flow compressor with a fan during operation with water ingestion was developed incorporating several two-phase fluid flow effects as follows: (1) ingestion of water, (2) droplet interaction with blades and resulting changes in blade characteristics, (3) redistribution of water and water vapor due to centrifugal action, (4) heat and mass transfer processes, and (5) droplet size adjustment due to mass transfer and mechanical stability considerations. A computer program, called the PURDU-WINCOF code, was generated based on the model utilizing a one-dimensional formulation. An illustrative case serves to show the manner in which the code can be utilized and the nature of the results obtained.Author

N84-29876*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENERGY EFFICIENT ENGINE PROGRAM CONTRIBUTIONS TO AIRCRAFT FUEL CONSERVATION
Peter G. Batterton 1984 28 p refs Proposed for presentation at the Aviation Fuel Conservation Symp., Washington, D.C., 10-11 Sep. 1984; sponsored by FAA
(NASA-TM-83741; E-2226; NAS 1.15:83741) Avail: NTIS HC A03/MF A01 CSCL 21E

Significant advances in high bypass turbofan technologies that enhance fuel efficiency have been demonstrated in the NASA Energy Efficient Engine Program. This highly successful second propulsion element of the NASA Aircraft Energy Efficiency Program included major contract efforts with both General Electric and Pratt & Whitney. Major results of these efforts will be presented including highlights from the NASA/General Electric E3 research turbofan engine test. Direct application of all the E3 technologies could result in fuel savings of over 18% compared to the CF6-50 and JT9D-7. Application of the E3 technologies to new and derivative engines such as the CF6-80C and PW 2037, as well as others, will be discussed. Significant portions of the fuel savings benefit for these new products can be directly related to the E3 technology program. Finally, results of a study looking at far term advanced turbofan engines will be briefly described. The study shows that substantial additional fuel savings over E3 are possible with additional turbofan technology programs. Author

N84-29877*# Pennsylvania State Univ., University Park. Mechanical Engineering Building.
A THEORETICAL AND EXPERIMENTAL STUDY OF TURBULENT NONEVAPORATING SPRAYS Final Report
A. S. P. Solomon, J.-S. Shuen, Q.-F. Zhang, and G. M. Faeth Jun. 1984 138 p refs
(Grant NAG3-190)
(NASA-CR-174668; NAS 1.26:174668) Avail: NTIS HC A07/MF A01 CSCL 21E

Measurements and analysis limited to the dilute portions of turbulent nonevaporating sprays injected into a still air environment were completed. Mean and fluctuating velocities and Reynolds stress were measured in the continuous phase. Liquid phase measurements included liquid mass fluxes, drop sizes and drop size and velocity correlation. Initial conditions needed for model evaluation were measured at a location as close to the injector exit as possible. The test sprays showed significant effects of slip and turbulent dispersion of the discrete phase. The measurements were used to evaluate three typical models of these processes: (1) a locally homogenous flow (LHF) model, where slip between the phases were neglected; (2) a deterministic separated flow (DSF) model, where slip was considered but effects of drop dispersion by turbulence were ignored; and (3) a stochastic separated flow (SSF) model, where effects of interphase slip and turbulent dispersion were considered using random-walk computations for drop motion. The LHF and DSF models did not provide very satisfactory predictions for the present measurements. In contrast, the SSF model performed reasonably well with no modifications in the prescription of eddy properties from its original calibration. Some effects of drops on turbulence properties were observed near the dense regions of the sprays. B.W.

N84-29878*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FUEL SAVINGS POTENTIAL OF THE NASA ADVANCED TURBOPROP PROGRAM
J. B. Whitlow, Jr. and G. K. Sievers 1984 56 p Presented at the Aviation Fuel Conservation Symp., Washington, D.C., 10-11 Sep. 1984; sponsored by FAA
(NASA-TM-83736; E-2218; NAS 1.15:83736) Avail: NTIS HC A04/MF A01 CSCL 21E

The NASA Advanced Turboprop (ATP) Program is directed at developing new technology for highly loaded, multibladed propellers for use at Mach 0.65 to 0.85 and at altitudes compatible with the air transport system requirements. Advanced turboprop engines offer the potential of 15 to 30 percent savings in aircraft block fuel relative to advanced turbofan engines (50 to 60 percent savings over today's turbofan fleet). The concept, propulsive efficiency gains, block fuel savings and other benefits, and the program objectives through a systems approach are described. Current program status and major accomplishments in both single rotation and counter rotation propeller technology are addressed. The overall program from scale model wind tunnel tests to large scale flight tests on testbed aircraft is discussed. Author

N84-29879*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECT OF CONTROL LOGIC MODIFICATIONS ON AIRSTART PERFORMANCE OF F100 ENGINE MODEL DERIVATIVE ENGINES IN AN F-15 AIRPLANE Final Report
David B. Crawford and Frank W. Burcham, Jr. Aug. 1983 30 p refs
(NASA-TM-85900; H-1243; NAS 1.15:85900) Avail: NTIS HC A03/MF A01 CSCL 21E

A series of airstarts were conducted in an F-15 airplane with two prototype Pratt and Whitney F100 Engine Model Derivative engines equipped with Digital Electronic Engine Control (DEEC) systems. The airstart envelope and the time required for airstarts were defined. Comparisons were made between the original airstart logic, and modified logic which was designed to improve the airstart capability. Spooldown airstarts with the modified logic were more successful at lower altitudes than were those with the original logic. Spooldown airstart times ranged from 33 seconds at

250 knots to 83 seconds at 175 knots. The modified logic improved the airstart time from 31% to 53%, with the most improved times at slower airspeeds. Jet fuel starter (JFS)-assisted airstarts were conducted at 7000 m and airstart times were significantly faster than unassisted airstarts. The effect of altitude on airstart times was small. Author

N84-29880# Ecole Polytechnique Federale de Lausanne (Switzerland). Lab. de Thermique Appliquee.
AEROELASTICITY IN TURBOMACHINE-CASCADES Final Scientific Report, 15 Dec. 1982 - 15 Dec. 1983
A. Boelcs, T. Fransson, and P. Suter 1 Feb. 1984 25 p
(Grant AF-AFOSR-0063-83)
(AD-A141905; EPFL/LTA-TM-3-84) Avail: NTIS HC A02/MF A01 CSCL 21/5

The aeroelastician needs reliable efficient methods for calculation of unsteady blade forces in turbomachines. The validity of such theoretical (or empirical) prediction models can only be established if researchers apply their flutter and forced vibration predictions to a number of well documented experimental test cases. Under the present project, a report with nine selected standard configurations for the mutual validity of experimental and theoretical results has been prepared and distributed. Together with the standard configurations, unified nomenclature and reporting formats, to be used in the present work, have been defined. Presently, 'blind tests' predictions are performed at several research institutes, whereafter the experimental and theoretical aeroelastic results will be compiled and analyzed during the third (final) year of the project. The potential for a very positive result from the joint research work has become increasingly larger, as many more institutions than orginally previewed are interested in the establishment of the validity of existing and future theoretical models for flutter. As part of the project, two experimental research programs have been initiated in fields where no data could be found in the open literature. Author (GRA)

N84-29881# Failure Analysis Associates, Palo Alto, Calif.
COST/RISK ANALYSIS FOR DISK RETIREMENT, VOLUME 1 Final Report, Feb. 1978 - Jun. 1983
S. W. Hopkins, P. M. Besuner, C. A. Rau, Jr., D. W. Allison, and J. W. Eischen 3 Feb. 1984 265 p
(Contract F33615-78-C-5005)
(AD-A141978; FAA-83-4-1-Vol-1; M/T3B-9201-Vol-1; AFWAL-TR-83-4089-Vol-1) Avail: NTIS HC A12/MF A01 CSCL 14/1

As the replacement cost for jet engine components increases and the average age of the fleet starts to approach the traditional design life, major life cycle cost savings can potentially be accrued from a Retirement for Cause (RFC) approach to component retirement. This approach takes advantage of the ability of most members of a population (or fleet) of engine components to perform safely for several lifetimes longer than the traditional design life. This report presents details of the development and evaluation of an RFC methodology. GRA

N84-29882# Naval Weapons Center, China Lake, Calif.
ANALYSIS OF PARTICULATES IN THE EXHAUST PLUME OF A TF30 ENGINE AT MILITARY POWER Interim Report, FY83
L. A. Mathews, C. A. Heller, J. H. Johnson, E. D. Erickson, and R. T. Loda May 1984 34 p
(DA Proj. F65-559)
(AD-A142510; AD-E900355; NWC-TP-6508) Avail: NTIS HC A03/MF A01 CSCL 21/5

This report presents particulate concentration, emission index and size distribution data in the plume of a TF30-P1 engine, run at military power in the open air. The particle size distribution data measured here show that the mass median aerodynamic diameter of the particles is in the range of 0.19-0.30 micrometer compared to an average of 0.18 micrometer for the test cell data for a rebuilt TF30-P414 engine. Recommendations are listed for future tests. GRA

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N84-29883*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DESIGN OF A CANDIDATE FLUTTER SUPPRESSION CONTROL LAW FOR DAST ARW-2
William M. Adams, Jr. and Sherwood H. Tiffany Jul. 1984 28 p refs Presented at the AIAA Guidance and Control Conf., Gatlinburg, Tenn., 15-17 Aug. 1983
(NASA-TM-86257; NAS 1.15:86257; AIAA-83-2221) Avail: NTIS HC A03/MF A01 CSCL 01C

A control law is developed to suppress symmetric flutter for a mathematical model of an aeroelastic research vehicle. An implementable control law is attained by including modified LQG (Linear Quadratic Gaussian) design techniques, controller order reduction, and gain scheduling. An alternate (complementary) design approach is illustrated for one flight condition wherein nongradient-based constrained optimization techniques are applied to maximize controller robustness. Author

N84-29884*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FLIGHT INVESTIGATION OF VARIOUS CONTROL INPUTS INTENDED FOR PARAMETER ESTIMATION
Mary F. Shafer Aug. 1984 20 p refs Presented at the AIAA Atmospheric Flight Mech. Conf., Seattle, 21-23 Aug. 1984
(NASA-TM-85901; H-1245; NAS 1.15:85901) Avail: NTIS HC A02/MF A01 CSCL 01C

An experiment assessing the stability and control derivatives resulting from various control inputs was undertaken using the F-8 digital fly by wire aircraft. Improved control inputs have been proposed as a means of making stability and contol derivative estimation more efficient, thus reducing the cost of flight testing and data analysis. The subject inputs were either generated by the pilot or preprogrammed in a remote ground computer and telemetered to the aircraft. Nine preprogrammed inputs and three pilot generated inputs were assessed at subsonic and supersonic flight conditions, and both unaugmented and highly augmented flight control systems were used. Effects of input amplitude were also assessed. The inputs were divided into two general types - sinusoidal or with corners (a rapid and distinct change in slope). The inputs with corners, performed in the unaugmented mode, produced the best sets of stability and control derivatives. The simplest of these inputs, the pilot generated doublet, produced sets of derivatives as good as those produced by the more complex inputs. Small inputs produced worse derivatives than the unaugmented mode, and sinusoidal inputs produced worse derivatives than corner containing inputs. B.W.

N84-29885*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SIMULATOR EVALUATION OF A REMOTELY PILOTED VEHICLE LATERAL LANDING TASK USING A VISUAL DISPLAY Final Report
Shahan K. Sarrafian Aug. 1984 16 p refs Presented at the AIAA Atmospheric Flight Mech. Conf., Seattle, 21-23 Aug. 1984
(NASA-TM-85903; H-1246; NAS 1.15:85903) Avail: NTIS HC A02/MF A01 CSCL 01C

A simulator evaluation of a remotely piloted research vehicle was conducted at NASA Ames Research Center's Dryden Flight Research Facility to determine the utility of a visual display when studying the influence of changes in the lateral stick gearing gains during landing approaches. The test vehicle used in this study was a highly maneuverable aircraft technology (HiMAT) aircraft, which is a 0.44 scale version of an envisioned small, single seat fighter airplane. Handling qualities ratings and comments obtained from pilots using a simulated visual display of a runway scene and a simulated instrument landing system (ILS) display were compared with the results of actual flight tests. The visual display was found to provide an adequate representation of the test vehicle in a visual landing approach, and it improved the roll response cues provided to the pilot. The handling qualities ratings and comments for flight and simulation visual landing approaches correlated well. The ILS simulation results showed reduced correlation compared with the flight results for ILS approaches. Handling qualities criteria for remotely piloted research vehicles are also discussed in this paper. Author

N84-29886# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
REVIEW AND COMPARISON OF DISCRETE AND CONTINUOUS GUST METHODS FOR THE DETERMINATION OF AIRPLANE DESIGN LOADS
R. Noback 17 Dec. 1982 69 p refs
(Contract RB-RLD-1982:1.1.2)
(NLR-TR-82134-U) Avail: NTIS HC A04/MF A01

The discrete gust and the continuous gust concepts of airplane load determination are reviewed, and the discrete gust method and the power spectral density method are compared using simple airplane models. No direct relation between the two methods exists. The main cause of the discrepancy is the difference in the relation between gust velocity and gust length in the two gust models. Author (ESA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N84-29887 British Aerospace Aircraft Group, Warton (England). Wind Tunnel Dept.
WALL PRESSURE SIGNATURE WIND-TUNNEL WALL-CONSTRAINT CORRECTION METHODS
J. G. Proctor Apr. 1984 42 p refs
(BAe-ARG-188) Copyright. Avail: Issuing Activity

Three methods of wall-constraint correction using boundary measurements of static pressure are assessed. The procedures offer an alternative to conventional theoretical techniques in areas of relative uncertainty such as very high incidence testing. It is recommended that a short test program to study the practicalities of an on-line matrix method be implemented in a 2.7 x 2.1m low speed wind tunnel. Author (ESA)

N84-29888*# Madison Magnetics, Inc., Wis.
MAGNETIC SUSPENSION AND BALANCE SYSTEM STUDY Final Report, Jun. 1983 - Mar. 1984
R. W. Boom, Y. M. Eyssa, G. E. McIntosh, and M. K. Abdelsalam Washington NASA Jul. 1984 118 p
(Contract NAS1-17428)
(NASA-CR-3802; NAS 1.26:3802) Avail: NTIS HC A06/MF A01 CSCL 14B

A compact design for a superconducting magnetic suspension and balance system is developed for a 8 ft. x 8 ft. transonic wind tunnel. The main features of the design are: a compact superconducting solenoid in the suspended airplane model; permanent magnet wings; one common liquid helium dewar for all superconducting coils; efficient new race track coils for roll torques; use of established 11 kA cryostable AC conductor; acceptable AC losses during 10 Hz control even with all steel structure; and a 560 liter/hour helium liquefier. Considerable design simplicity, reduced magnet weights, and reduced heat leak results from using one common dewar which eliminates most heavy steel structure between coils and the suspended model. Operational availability is thought to approach 100% for such magnet systems. The weight and cost of the magnet system is approximately one-third that of previous less compact designs. Author

N84-29889# Federal Aviation Administration, Washington, D.C. Associate Administrator for Airports.
REPORT OF ACCOMPLISHMENTS UNDER THE AIRPORT IMPROVEMENT PROGRAM Annual Report, period ending 30 Sep. 1983
V. J. Martin 30 Sep. 1983 112 p
(AD-A142444; FAA-ARP-84-2; AR-2) Avail: NTIS HC A06/MF A01 CSCL 01/5

Section 521 of the Airport and Airway Improvement Act of 1982 (Public Law 97-248) requires that the Secretary of Transportation submit an annual report to Congress describing the accomplishments of the airport grant program. This report covers activities for the fiscal year ending September 30, 1983. Author (GRA)

N84-29890# European Space Agency, Paris (France).
THE TECHNICAL UNIVERSITY OF DENMARK (TUD)-ESA SPHERICAL NEAR FIELD ANTENNA TEST FACILITY, LYNGBY, DENMARK
J. E. Hansen Apr. 1984 22 p refs Original contains color illustrations
(ESA-BR-19; ISSN-0250-1589) Avail: NTIS HC A02/MF A01; ESA, Paris FF 60 Member States, AU, CN and NO (+20% others)

A radio anechoic chamber for the determination of antenna characteristics and the measurement of scattering cross-sections of radar targets in the frequency range 50 MHz to 50 GHz is presented. It is 12 m long, 10 m wide and 8 m high (measured between the tips of absorbers). The chamber and control room are enclosed in RF sheilding. Activities include precision gain calibration of standard-gain horns; maintenance of sets of calibrated standard-gain horns which are available on a loan basis to ESA projects; calibration of near-field probes; precision measurement of gain, directivity, phase, co-polar and cross-polar patterns for microwave antennas with diameters of up to 6.7 m; and research on measurement techniques. Author (ESA)

N84-29891# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
HALF-MODEL TESTING IN THE NLR HIGH SPEED WIND TUNNEL (HST) Status Report, 1981
S. J. Boersen Aug. 1982 76 p refs
(NLR-TR-82123-U) Avail: NTIS HC A05/MF A01

The reliability of half-span model testing in a high speed tunnel is discussed. Comparison with full-span model results shows that tests on large half-span models suffer from significant mounting and wall interference effects; the usual full-span model test accuracy cannot be achieved. A mounting using a non-metered boundary layer and labyrinth seal is recommended. Contact between metered and non-metered parts must be avoided. Corrections for half-span model test results were derived from fuselage-only and wing-fuselage comparisons of half-span and full-span models. Wing deformation should be accounted for. Tunnel blockage corrections were deduced from a comparison of average wing pressure distributions of half-span and full-span wings. Author (ESA)

N84-29892# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
DESCRIPTION AND VALIDATION OF THE TWO DIMENSIONAL TEST SETUP FOR MULTIPLE AIRFOILS IN THE PRESSURIZED WIND TUNNEL HST
H. L. J. Vogelaar 18 Mar. 1983 36 p refs
(NLR-TR-83031-U) Avail: NTIS HC A03/MF A01

The two-dimensional test setup in a pressurized wind tunnel (HST) for the testing of multiple airfoils at high Reynolds numbers is described. Results of tests with this setup were validated by tests performed in the HST and in an atmospheric wind tunnel. The tunnel wall boundary layer control system and the tunnel wall correction method are outlined. Results of model deformation tests are discussed. Author (ESA)

N84-29893# General Accounting Office, Washington, D. C. Resources Community and Economic Development Div.
FEDERAL AVIATION ADMINISTRATION'S SYSTEM FOR PRIORITIZING AIRPORT GRANTS
13 Apr. 1984 20 p
(PB84-181650; GAO/RCED-84-124; B-214677) Avail: NTIS HC A02/MF A01 CSCL 01E

The Federal Aviation Administration's (FAA's) system for prioritizing discretionary airport grant projects is reviewed. The airports named in 1982 and 1983 congressional appropriation reports examined to determine if naming airports for priority consideration causes the FAA to fund low priority projects. Airport planning and development projects in four FAA regions during fiscal years 1982 and 1983 analyzed to determine: (1) if FAA funded the projects in conformance with its priority system, and (2) the basis for funding projects that ranked low under the system. GRA

N84-29894 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
A SURVEY OF BIODYNAMIC TEST DEVICES AND METHODS
Noel S. Nussbaum (Aerospace Medical Research Lab.) Apr. 1984 58 p refs
(AD-A142467; AGARD-AG-276) Copyright. Avail: NTIS HC A04/MF A01 CSCL 06/19

The author has up-dated AGARD Report No. 658 "A Catalogue of Current Impact Devices" to include new/revised facilities, has presented research procedures in use at each facility and described the personnel capabilities available. The information about each facility has been obtained largely from inputs completed by the establishments concerned, technical reports, previous listings and personal visits. Author

N84-29964# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
AERODYNAMIC AND PROPULSION TEST UNIT (APTU) PERFORMANCE WITH A VITIATED AIR HEATER
R. H. Burt, D. W. Stallings, and M. Swillum (AEDC) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 261-270 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 14/2

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N84-29895# Bundesministerium fuer Forschung und Technologie, Bonn (West Germany).
THE USE OF SPACE LABORATORIES FOR MATERIALS INVESTIGATIONS, PROCESS ENGINEERING, AND SCIENTIFIC PURPOSES [NUTZUNG VON WELTRAUMLABORATORIEN FUER WERKSTOFFORSCHUNG UND VERFAHRENSTECHNIK SOWIE FUER WIRTSCHAFTLICHE ZWECKE]
1983 32 p ref In GERMAN
Avail: NTIS HC A03/MF A01

The German research program on materials investigation and process engineering in space is reviewed. The effects of weightlessness are emphasized. The different research domains are: boundary layers/transport phenomena; metals/composite materials; crystals; physical chemistry/process engineering. The different flying possibilities in the framework of these research programs are described. Author (ESA)

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N84-29896# Barcelona Univ. (Spain). Seccio de Mathematiques.
QUALITATIVE STUDY OF THE PLANAR ISOSCELES THREE-BODY PROBLEM
Jaume Llibre, Regina Martinez, and Carles Simo 1984 95 p refs
(PREPRINT-35) Avail: NTIS HC A05/MF A01

The planar three body problem obtained when the masses form an isosceles triangle every time is considered for the flow on a fixed level of negative energy. A topological representation of the energy manifold including the triple collision and infinity as boundaries of that manifold is obtained. The existence of orbits connecting the triple collision and the infinity gives homoclinic and heteroclinic orbits. Using these orbits and the homothetic solutions of the problem, orbits which pass near triple collision and near infinity by pairs of sequences are characterized. One of the sequences describes the regions visited by the orbit, the other refers to the behavior of the orbit between two consecutive passages by a suitable surface of section. This symbolic dynamics, which has a topological character, is given in an abstract form and is applied to the isosceles problem. Author (ESA)

N84-30466*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VERIFICATION OF THE ACCURACY OF GEM-L2 IN RESPONSE TO CRITICISM BY LAMBECK AND COLEMAN
Francis J. Lerch *In its* Res. Activities of the Geodyn. Branch Jun. 1984 13 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 22A

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

No abstracts in this category.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N84-29897*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HEAT TRANSFER AND OIL FLOW STUDIES ON A SINGLE-STAGE-TO-ORBIT CONTROL-CONFIGURED WINGED ENTRY VEHICLE
V. T. Helms, III and P. F. Bradley Jun. 1984 140 p refs
(NASA-TM-85833; NAS 1.15:85833) Avail: NTIS HC A07/MF A01 CSCL 22B

Results are presented for oil flow and phase change paint heat transfer tests conducted on a 0.006 scale model of a proposed single stage to orbit control configured vehicle. The data were taken at angles of attack up to 40 deg at a free stream Mach number of 10 for Reynolds numbers based on model length of 0.5 x 10 to the 6th power, 1.0 x 10 to the 6th power and 2.0 x 10 to the 6th power. The magnitude and distribution of heating are characterized in terms of angle of attack and Reynolds number aided by an analysis of the flow data which are used to suggest the presence of various three dimensional flow structures that produce the observed heating patterns. Of particular interest are streak heating patterns that result in high localized heat transfer rates on the wing windward surface at low to moderate angles of attack. These streaks are caused by the bow-shock/wing-shock interaction and formation of the wing-shock. Embedded vorticity was found to be associated with those interactions. Author

N84-29898# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A COMPUTER MODEL FOR EVALUATION OF LAUNCH VEHICLE AND TARGET TRACKING ERROR ASSIGNMENTS FOR DIRECT ASCENT, DEEP SPACE ASAT (ANTI-SATELLITE) SYSTEMS M.S. Thesis
R. C. Barclay Dec. 1983 90 p
(AD-A141136; AFIT/GSO/OS/83D-1) Avail: NTIS HC A05/MF A01 CSCL 15/3

An unclassified computer model was developed for first order evaluation of deep space Anti-satellite (ASAT) targeting error assignments. Two independent error sources are modeled. With deep space tracking accuracies on the order of kilometers, there is uncertainty in the exact target position. Errors introduced by the launch vehicle guidance system result in uncertainty in the exact position of the ASAT itself. Once the target is acquired by the ASAT sensor subsystem, the maneuver subsystem must then have the capability to make the necessary trajectory corrections to precent a miss. The model assumes a direct ascent vehicle for which the user selects a trajectory by choosing the burnout and intercept position vectors, and a time of flight between them. Monte Carlo simulation is used to generate errors in burnout position and velocity, and intercept position from trivariate normal distributions scaled to user input standard deviations. This is repeated for 500 iterations, from which a mean miss distance and delta V required for trajectory correction can be determined, and used for further analysis. GRA

N84-29899# Naval Postgraduate School, Monterey, Calif.
APPLICATION OF SENSITIVITY ANALYSIS TO AERODYNAMIC PARAMETERS OF A BANK TO TURN MISSILE M.S. Thesis
Ribeiro T. DaSilva Dec. 1983 250 p
(AD-A141940; AD-E800940) Avail: NTIS HC A11/MF A01 CSCL 16/4

This thesis is an application of parameter sensitivity analysis to aerodynamic parameters of a Bank-to-Turn missile. In the development a brief review of trajectory sensitivity theory is presented. A linear analysis is performed using an Uncoupled Pitch Channel Autopilot and a Coupled Roll-Yaw Channel Autopilot of the missile taken as model. Finally, a nonlinear analysis is given for the system. Comparisons between the linear and nonlinear cases are outlined. Author (GRA)

N84-29900# Weapons Systems Research Lab., Adelaide (Australia).
WIND TUNNEL TESTS ON A TUBE-LAUNCHED MISSILE CONFIGURATION WITH A DEFLECTABLE NOSE CONTROL AND A NOVEL WRAP-AROUND FIN STABILISER
K. D. Thomson Aug. 1983 34 p
(AD-A142082; WSRL-0327-TR) Avail: NTIS HC A03/MF A01 CSCL 16/4

Experiments were conducted in the Mach number range 0.80 to 2.00 on a tube-launched missile configuration with a deflectable nose control and a wrap-around fin stabilizer having six fins disposed in a symmetrical triform arrangement. The results show that the control effectiveness increases markedly with Mach number. Trim curves are non-linear at subsonic speeds and approach linearity at supersonic Mach numbers. The results were applied to a small hypothetical missile configuration and indicate that the nose control is powerful enough to provide a terminal control capability. For the case considered, in subsonic flight the missile must fly on a near-ballistic trajectory. However, in supersonic flight the control is powerful enough to permit horizontal flight above M = 1.5 while retaining a sufficient reserve to provide a terminal correction capability. Detailed control system assessments were not made. Author (GRA)

N84-29918# TRW Space Technology Labs., Redondo Beach, Calif.
TRACKING AND DATA RELAY SATELLITE LAUNCH RECOVERY MISSION
Robert L. Sackheim and Gordon A. Dressler *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 163-182 refs
(For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 22/2

N84-29919*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A STUDY OF METHODS FOR ALLEVIATION OF FLOW DECAY RISK TO THE GALILEO SPACECRAFT
Gary D. Blue and Robert W. Rowley *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 183-194 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 22B

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N84-29901*# Analytical Mechanics Associates, Inc., Hampton, Va.
STS-13 (41-C) BET PRODUCTS
John T. Findlay, G. Mel Kelly, Judy G. McConnell, and Michael L. Heck Hampton, Va. NASA. Langley Research Center Jul. 1984 141 p
(Contract NAS1-16087)
(NASA-CR-172350; NAS 1.26:172350; AMA-84-11) Avail: NTIS HC A07/MF A01 CSCL 22B

Results from the STS-13 (41-C) Shuttle entry flight are presented. The entry trajectory was reconstructed from an altitude of 700 kft through rollout on Runway 17 at EAFB. The anchor epoch utilized was April 13, 1984 13(h)1(m)30.(s)0 (46890(s).0) GMT. The final reconstructed inertial trajectory for this flight is BT13M23 under user catalog 169750N. Trajectory reconstruction and Extended BET development are discussed in Section 1 and 2, respectively. The NOAA totem-pole atmosphere extracted from the JSC/TRW BET was adopted in the development of the LaRC Extended BET, namely ST13BET/UN=274885C. The Aerodynamic BET was generated on physical nine track reel NC0728 with a duplicate copy on NC0740 for back-up. Plots of the more relevant parameters from the AEROBET are presented in Section 3. Section 4 discusses the MMLE input files created for STS-13. Appendices are attached which present spacecraft and physical constants utilized (Appendix A), residuals by station and data type (Appendix B), a two second spaced listing of trajectory and air data parameters (Appendix C), and input and output source products for archival (Appendix D). Author

N84-29902*# Alabama Univ., Huntsville. Energy and Environment Center.
OMV: A SIMPLIFIED MATHEMATICAL MODEL OF THE ORBITAL MANEUVERING VEHICLE Interim Report
William Teoh Aug. 1984 179 p refs
(Contract NAS8-35670)
(NASA-CR-171123; NAS 1.26:171123; UAH-RR-407) Avail: NTIS HC A09/MF A01 CSCL 22B

A model of the orbital maneuvering vehicle (OMV) is presented which contains several simplications. A set of hand controller signals may be used to control the motion of the OMV. Model verification is carried out using a sequence of tests. The dynamic variables generated by the model are compared, whenever possible, with the corresponding analytical variables. The results of the tests show conclusively that the present model is behaving correctly. Further, this model interfaces properly with the state vector transformation module (SVX) developed previously. Correct command sentence sequences are generated by the OMV and and SVX system, and these command sequences can be used to drive the flat floor simulation system at MSFC. Author

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-29903*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
APPROXIMATION TECHNIQUES FOR PARAMETER ESTIMATION AND FEEDBACK CONTROL FOR DISTRIBUTED MODELS OF LARGE FLEXIBLE STRUCTURES Final Report
H. T. Banks and I. G. Rosen Jun. 1984 22 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-172411; NAS 1.26:172411; ICASE-84-26) Avail: NTIS HC A02/MF A01 CSCL 22B

Approximation ideas are discussed that can be used in parameter estimation and feedback control for Euler-Bernoulli models of elastic systems. Focusing on parameter estimation problems, ways by which one can obtain convergence results for cubic spline based schemes for hybrid models involving an elastic cantilevered beam with tip mass and base acceleration are outlined. Sample numerical findings are also presented. B.W.

N84-29904# European Space Agency, Paris (France).
DYNAMIC SYNTHESIS AND EVALUATION OF SPACECRAFT STRUCTURES
C. Stavrinidis (European Space Research and Technology Center, Noordwijk, Netherlands) Mar. 1984 111 p refs
(ESA-STR-208; ISSN-0379-4067) Avail: NTIS HC A06/MF A01

A general procedure for coupling dynamical equations is outlined. Fixed and free boundary modal synthesis procedures are described. Mode sets for dynamic synthesis are discussed. Author (ESA)

N84-29905# Office of Technology Assessment, Washington, D.C.
SALYUT: SOVIET STEPS TOWARD PERMANENT HUMAN PRESENCE IN SPACE
Dec. 1983 116 p refs
(PB84-181437; OTA-TM-STI-14) Avail: NTIS HC A06/MF A01 CSCL 22B

The range of capabilities that the Soviets have achieved in using men and women aboard the Salyut stations and the directions their program may take are examined. The Office of Technology Assessment (OTA) found that the US is ahead of the USSR in most areas of space science and application. The Soviets are more knowledgeable in space biology and medicine. The USSR's venture into space differs in two major respects: (1) expanding human habitation beyond Earth is a fundamental goal; and (2) in the modification and adaptation of technology already proven successful. GRA

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-29906# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md. Chemical Propulsion Information Agency.
THE 1984 JANNAF PROPULSION MEETING, VOLUME 1
Karen L. Strange, ed. Feb. 1984 384 p refs Meeting held in New Orleans, 7-9 Feb. 1984 5 Vol.
(Contract N00024-83-C-5301)
(AD-A142852; CPIA-Publ-390-Vol-1) Avail: NTIS HC A17/MF A01 CSCL 21/8

Topics covered include Space Shuttle propulsion, liquid propellant booster engines, satellite and space station attitude control systems, liquid oxidizer compatibility, and electric propulsion. Author and source indexes to this volume are included. For individual titles, see N84-29907 through N84-29938.

N84-29907# Rockwell International Corp., Downey, Calif. Development and Production Div.
SHUTTLE ORBITER MAIN PROPULSION SYSTEM HARDWARE DEVELOPMENT AND CERTIFICATION FOR FLIGHT
J. E. Oslund, R. H. Allbritain, and E. R. Thomas *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 1-8 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

The orbiter main propulsion system includes the LO2/LH2 propellant feed system, the helium valve actuation and purge system, the GN2 purge system, propellant bleed and dump systems, external tank pressurization systems, propellant gaging and engine cutoff sensor systems, and the LH2 recirculation system. Typical system hardware programs are discussed, including development, certification testing, verification testing [using the main propulsion test article (MPTA) at the National Aeronautics and Space Administration's (NASA's) test facility in Mississippi], and final certification (flight performance). Key problem areas are covered to highlight problem identification and problem solving techniques. These areas include the 43.18-cm(17-in.) orbiter/external tank LO2 and LH2 disconnect valves, which had a closure flapper stability problem, and the valves that control the flow of high temperature and high pressure gaseous oxygen and hydrogen ullage pressurant gases, which provided design challenges relative to metal ignition, fretting, and pneumatic balance. Author

N84-29908# Rockwell International Corp., Downey, Calif. Space Transportation and Systems Group.
THE SPACE TRANSPORTATION SYSTEM REACTION CONTROL SYSTEM AND ORBITAL MANEUVERING SUBSYSTEM
F. C. Svenson and L. F. Duncan *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 9-18 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

The Space Transportation System (STS) reaction control subsystem (RCS) and orbital maneuvering subsystem (OMS) component and subsystem ground certification and flight test programs are described to show that the RCS and OMS performances met specification requirements and are compatible with the STS operational phase requirements. Descriptions of the RCS and the OMS, a discussion of problems encountered during the ground and flight test programs, and a description of the improvements implemented as a result of these programs are included. Recent ground and flight test performances are discussed. The systems are space rated as fully capable of meeting STS operational phase requirements with a minimum of refurbishment. System improvements that are under investigation will be discussed. Author

N84-29909*# National Aeronautics and Space Administration. White Sands Test Facility, N. Mex.
IRON NITRATE AND MON-3 NITROGEN TETROXIDE c28
I. D. Smith *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 19-28 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21I

The NASA White Sands Test Facility (WSTF) recently completed three nitrogen tetroxide (N2O4) oxidizer studies. These included an extensive evaluation of the solubility of the iron nitrate flow decay material in MON-3 (Space Shuttle grade) nitrogen tetroxide over the temperature range 40 to 120 F. The studies also evaluated the influence of nitric oxide (NO) content and water equivalent on the solubility. The results indicate that the solubility is highly influenced by NO content and to a lesser degree by the water equivalent. A second study evaluated two methods for the reduction of the iron content of oxidizer. These included: (1) combined membrane (5 micron) filtration and temperature reduction, and (2) molecular sieves. The first method was found to be only partially satisfactory due to its inefficiency, while the use of Linde LZ-Y82 molecular sieve satisfactorily reduced the iron content to 0.1 to 0.2 ppm in a single pass through a bed of the sieve material. The third study evaluated the effect of the stainless steel retention screen material used in the Space Shuttle OMS and RCS tanks on the iron content of the oxidizer. The results indicated that oxidizer iron content increased rapidly upon initial contact with the screen material but fell to a lower production rate as the exposure continued. The tests indicated that some phenomenon similar to passivation occurs in the exposure sequence. Author

N84-29910*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VERY LOW THRUST AND LOW CHAMBER PRESSURE GO2/GH2 THRUSTER TECHNOLOGY
R. A. Bjorklund and M. A. Appel *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 29-38 refs (For primary document see N84-29906 20-20)
(Contract NAS7-918)
Avail: NTIS HC A17/MF A01 CSCL 21H

An experimental program was conducted to evaluate very low thrust and low chamber pressure thruster technology using gaseous oxygen (GO2) and gaseous hydrogen (GH2) propellants for spacecraft and satellite reaction control system (RCS) application. This program is a continuation of the GO2/GH2 ignition technology study, wherein both electric spark and catalytic igniters were evaluated. A nominal 2.2-N (0.5-lb (sub f)) thruster with a coaxial-type injector and a rhenium metal thrust chamber was used to develop design data and evaluate the use of a hydrogen film-barrier to prevent the high-temperature oxidation of the rhenium. Initial tests of this configuration have been very encouraging, with delivered vacuum specific impulse ranging up to 4098 N-s/kg (418 lb(sub f)/s/lb(sub m) at an O/F ratio of 3.5:1 and chamber pressure of 485 kN/sq m (70 psia). Successful ignitions have been obtained using an experimental low-energy inductive-type spark exciter delivering 0.2 mJ per spark at test cell pressure as low as 0.014 kN/sq m (5.0 psia). Total engine operating time to date with a rhenium chamber has exceeded one hour of combined steady-state and multiple-starts (pulse-mode) operations without measurable thrust chamber deterioration. Author

N84-29911# Rocket Research Corp., Redmond, Wash.
PERFORMANCE VERIFICATION TESTS OF AN UPRATED AUGMENTED CATALYTIC THRUSTER
F. X. McKevitt and C. I. Miyake *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 39-46 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

The results of a series of performance verification tests conducted to characterize the performance of an uprated Augmented Catalytic Thruster (ACT) are described and presented. A modified Rocket Research Company MR-501 ACT was tested over the thrust range of 40 to approximately 200 millipounds with augmented steady-state and off-pulsing runs as well as unaugmented steady-state and on-pulsing runs. Author

N84-29912# Marquardt Corp., Van Nuys, Calif.
LOW THRUST BIPROPELLANT ENGINE DEVELOPMENT
T. E. Hudson, J. G. Campbell, and R. C. Stechman *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 47-53 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

A 1.0 lbf thrust level earth storable bipropellant rocket engine was developed to meet the operational requirements of the next generation of three axis and spin stabilized controlled military and commercial satellites. This radiation-cooled engine design is capable of meeting all duty cycles, including long steady-state burn requirements. The engine uses torque motor or solenoid valves without compromising its operational or performance capabilities. Author

N84-29913# Aerojet Techsystems Co., Sacramento, Calif.
DUAL MODE PROPULSION SYSTEM ENGINE TESTING FOR INTELSAT
G. M. Meagher and A. W. McPeak *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 55-64 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

A hot fire altitude and sea level test program was conducted using N2O4/N2H4 propellants by the Aerojet TechSystems Company with INTELSAT funding on engines developed under AFRPL funding. Interest in this propellant combination was generated by INTELSAT due to the perceived system advantages which could be realized from a high performance bipropellant apogee engine combined with existing monopropellant ACS engines. The test program investigated the performance, stability, durability and plume contamination of the N2O4/N2H4 propellant combination in existing thrusters originally designed to operate on N2O4/MMH. Experimental data was obtained with 22 N (5-lbF) and 440 N (100-lbF) thrust engines. Test results show that performance increased 4 to 6% as did maximum throat temperatures 55 K (100 F) with the shift to the N2O4/N2H4 propellant combination. These temperatures are still within the acceptable range for the silicide coating of the combustion chamber and nozzle. A data base was now obtained from which optimized N2O4/N2H4 engines can be designed and built for application to higher performance or dual mode propulsion systems (bipropellant/monopropellant propulsion). Author

N84-29914# Rocketdyne, Canoga Park, Calif.
SSME MODIFICATIONS FOR ON-DEMAND LAUNCH VEHICLES
F. M. Kirby *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 65-70 ref (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

The Space Shuttle Main Engine will be the primary liquid propellant rocket engine for Earth to orbit systems for many years. It is therefore economically attractive to adapt it to future on demand launch vehicle requirements. With modifications, the engine can be tailored to this class of launch vehicles. Modifications evaluated in vehicle studies are described. These include changes that improve the engine performance, weight, start conditions, and turnaround maintenance time. M.A.C.

N84-29915*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROPULSION OPTIONS FOR ORBIT-ON-DEMAND
James A. Martin *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 71-90 refs Previously announced as A84-19880 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21H

Vehicles which can achieve orbit within minutes of a command decision may be needed in the future for a variety of missions. Such orbit on demand vehicles may have propulsion requirements that are somewhat different from vehicles designed for routine transportation, but the propulsion evaluation studies of the past need to be considered as a starting point for orbit on demand vehicle studies. This paper surveys airbreathing propulsion studies including composite, airturbo-rocket, and scramjet systems and rocket propulsion studies including composite, airturborocket, and scramjet and rocket propulsion studies including dual-fuel and pure hydrocarbon systems. One indication from the results is that a horizontal takeoff airbreathing system with supersonic staging will have a higher development cost than rocket systems primarily because of the cost of the airbreathing engine development. Another indication is that pure hydrocarbon rocket propulsion for a vertical takeoff system may be feasible. Eliminating the requirement for hydrogen fuel may be worthwhile for orbit on demand vehicles. (IAA)

N84-29916# Science Applications, Inc., Los Angeles, Calif.
RECENT APPLICATIONS OF THE CONTAM 3 COMPUTER MODEL TO SPACECRAFT PROPULSION SYSTEMS
R. J. Hoffman *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 91-148 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

The recently completed CONTAM III computer model for the prediction of bipropellant engine performance, multiphase nozzle and high altitude exhaust plume flowfields, and plume contamination effects is applied to several communications satellites and planetary spacecraft. The latest version of the code (CONTAM III) includes improved prediction of the combustion processes in liquid bipropellant engines, semiautomated computation of unburned bipropellant droplet distribution for input to the CONTAM multiphase nozzle and plume flowfield analysis, and expansion of the plume flowfield into the extreme backflow region. Some of the recent improvements to the CONTAM model are summarized, and the applications of CONTAM III to spacecraft propulsion systems are examined. A comparison with vacuum chamber experimental results is presented. M.A.C.

N84-29917# RCA Astro-Electronics Div., Princeton, N. J.
EVOLUTION AND FLIGHT HISTORY OF THE DEFENSE METEOROLOGICAL SATELLITE PROGRAM (DMSP) PROPULSION MODULE
T. W. Auslander and D. L. Balzer *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 149-162 ref (For primary document see N84-29906 20-20)
(Contract F04701-72-C-0221)
Avail: NTIS HC A17/MF A01 CSCL 21/8

The Defense Meteorological Satellite Program (DMSP) satellites utilize a monopropellant hydrazine propulsion module during the ascent phase for attitude control and apogee trim, and later in the mission to provide a backup for the attitude control subsystem (ACS) on orbit. The pressure regulated, mixed mode propulsion subsystem includes large hydrazine rocket engines for major velocity corrections and two lb(f) gaseous nitrogen thrusters for attitude control functions. The design and operational changes as well as the significant flight history are examined. M.A.C.

N84-29918# TRW Space Technology Labs., Redondo Beach, Calif.
TRACKING AND DATA RELAY SATELLITE LAUNCH RECOVERY MISSION **c15**
Robert L. Sackheim and Gordon A. Dressler *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 163-182 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 22/2

On April 5, 1983, the Tracking and Data Relay Satellite (TDRS), Flight 1, was incorrectly inserted into an elliptical orbit as a result of a malfunction of the Inertial Upper Stage (IUS) injection vehicle. The onboard Reaction Control System (RCS) hyrazine thrusters stabilized the spacecraft following separation from the IUS. Severe damage occurred to both the primary and redundant negative roll thrusters, located near the spacecraft to IUS mating interface, during the separation (at the 180 deg/s tumbling rate) and initialization sequence. In spite of this damage, the onboard RCS provided the necessary impulse to raise the perigee to geosynchronous altitude. Modifications to the attitude control modes were necessary to successfully accomplish the orbit raising without use of negative roll control thrusters and to avoid overheating of other RCS thrusters due to protracted operation (up to 3 hr) at off nominal, worst case duty cycles. The way that the hydrazine fueled RCS provided the impulse to raise TDRS perigee approximately 13,900 km (860 statute miles) to the necessary geosynchronous altitude is investigated. A description of the spacecraft in general and the operation of the two delta V thrusters, in particular, generating an average thrust of 2.7 Nt (0.6 1bf) and consuming a combined total of 363 kg (700 pounds) of hydrazine over 44 hours in 38 separate burns, is also presented. M.A.C.

N84-29919*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A STUDY OF METHODS FOR ALLEVIATION OF FLOW DECAY RISK TO THE GALILEO SPACECRAFT **c15**
Gary D. Blue and Robert W. Rowley *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 183-194 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 22B

The Galileo spacecraft provides an example of a long term mission (four or more years) requiring high reliability for the propulsion system. The attitude control thrusters utilize nitrogen tetroxide oxidizer in an assembly containing small diameter tubing and orifices, both of which are susceptible to flow decay. The elimination of flow decay phenomenon is addressed from the standpoint of removal of soluble iron species from nitrogen tetroxide oxidizer and lessening the rate of recontamination by removal of impurity water. Flow of NTO through columns of certain zeolite molecular sieve adsorbents are found to greatly reduce the undesirable impurities without otherwise altering the propellant composition or introducing any deleterious substances. Design parameters are given for a purification train consisting of two adsorption columns and a filter in series, suitable for processing 125-250 gallons of NTO in less than one working day. M.A.C.

N84-29920*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PURIFICATION OF NITROGEN TETROXIDE FOR LONG-TERM RELIABILITY **c28**
C. M. Moran and G. D. Blue *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 195-200 refs Sponsored in part by AFSD (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21I

Recent emphasis on long term, small bipropellant propulsion systems has again brought into focus the flow decay problem of nitrogen tetroxide (NTO). A process is under development to purify NTO to guarantee user specified requirements and to establish a component cleaning standard to insure a minimum of contamination. A materials compatibility study is described with the goal of providing long term reliability data. A comprehensive survey of NTO purification processes is conducted and testing has begun on the effectiveness of these processes. Cleaning techniques are evaluated and the effects on corrosion rates are determined. The design of a test matrix for laboratory scale materials compatibility study is established for determining the long term effects of using spacecraft grade NTO. M.A.C.

N84-29921# Martin Marietta Aerospace, Denver, Colo.
HYDROGEN FLUORIDE FORMATION AND METAL CORROSION

IN FREON-CONTAMINATED PROPELLANTS c28
T. J. Giordano, C. H. Mosher, E. A. Kern, and C. S. Geoffroy *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 201-214 refs (For primary document see N84-29906 20-20) (Proj. D01-R)
Avail: NTIS HC A17/MF A01 CSCL 21/9

Hydrazine and monomethyhydrazine (MMH) become corrosive to aluminum, titanium, and solder when contaminated with Freon TF. This corrosion is caused by a product of the reaction of hydrazine or MMH with Freon and is catalyzed by stainless steel. A literature survey and preliminary laboratory studies indicate that the corrosive species is hydrogen fluoride. An electrochemical method is developed for determining hydrogen fluoride concentrations in fuel. The changes in hydrogen fluoride concentrations with time are consistent with predictions that hydrogen fluoride is the end product of multi step reaction pathways. Hydrogen fluoride formation is affected by dissolved iron salts or stainless steel specimens in the fuel. Corrosion of stainless steel and titanium is greatly accelerated by an increase in temperature. It is recommended that Freon use be excluded from propulsion systems whenever possible. M.A.C.

N84-29922# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
ELECTROSTATIC FILTRATION OF N2O4 FOR REMOVAL OF SOLID AND VAPOR CONTAMINANTS c28
P. Mahadevan and P. Breisacher *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 215-220 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/9

An electrostatic filtration technique is examined to filter out the colloidal and particulate iron contaminant level in liquid N2O4 to an acceptable concentration for short term space missions and to reduce the volatile iron content to much lower levels suitable for very long missions. The filtration medium, known, as an electret is made of polypropylene. The material is precharged electrostatically to very high charge densities. Electret filtration of liquid N2O4 is an attractive alternate processing technique for the reduction of the iron content of the oxidizer before it is pumped into fuel tanks on flight hardware. Since the filter is not easily saturated, it calls for infrequent changes of the filter medium. The oxidizer requires no preprocessing (such as chilling and precipitation) before filtration. M.A.C.

N84-29923*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
STRESS-CORROSION CRACK-GROWTH STUDY OF TITANIUM ALLOY TI-6AI-4V EXPOSED TO FREON PCA AND NITROGEN TETROXIDE MON-1 c26
Roy A. Bjorklund *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 221-232 refs Sponsored in part by AFSD (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 11F

An experimental fracture-mechanics program was performed to determine the stress-corrosion crack-growth sensitivity of the propellant tank material, titanium alloy Ti-6Al-4V, for aerospace satellite applications involving long-term exposure to Freon PCA and nitrogen tetroxide MON-1. Sustained-load tests were made at a 49 C (120 F) constant temperature using thin-gauge tensile test specimens containing semielliptical surface flaws. Test specimen types included parent metal, center of weld, and weld-heat-affected zone. It was concluded that Ti-6Al-4V alloy is not adversely affected in a stress environment when exposed to Freon PCA for 1000 hours followed by exposure to nitrogen tetroxide MON-1 for 2000 hours at stress levels up to 80% of the experimental critical plane-strain stress-intensity factor. Author

N84-29924# Textron Bell Aerospace Co., Buffalo, N. Y.
THE COMPATIBILITY OF MON-3 AND 301 CRYOFORMED STAINLESS STEEL c26
H. Ph. Heubusch and A. Orsini, (Arde Corp., Mahwah, N.J.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 233-244 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 11/6

The compatibility of two types of MON-3 and 301 Cryoformed Stainless Steel is being determined through a cooperative laboratory program sponsored by INTELSAT and ARDE', Inc. One source of MON-3 is Bell Aerospace Textron, in compliance with National Aerospace Standard 3620; the other source is MBB (Messerschmitt, Bolkow and Blohm). Compatibility test specimens were prepared by ARDE', Inc. Static exposure tests as functions of time and temperature and post test metallurgical and filtrate analyses are being performed in the laboratories of Bell Aerospace Textron. Supporting surface chemistry analyses by electron spectroscopy (ESCA and Auger) are being performed in the laboratories of Nottingham University, UK. Data are being evaluated to compare methods of surface preparation pre-exposure, to determine corrosion mechanisms, to establish accurate corrosion rates, to assess the implication of long term service of stainless steel with typical American and European types of high purity MON-3, and to evaluate the prospects for flow decay with each MON-3/metal combination. B.W.

N84-29925# Aerojet Techsystems Co., Sacramento, Calif.
SHUTTLE PAYLOAD IMPROVEMENT BY LOW RISK MODIFICATIONS TO THE OMS ENGINE
Dan David *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 245-252 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

Modification of the Orbit Maneuvering System (OMS) engine is a low-risk approach to improving the payload capability of the Space Shuttle. The OMS engine has proven to be a reliable operating engine. It is appropriate to build upon this reliability and evolve a higher performing OMS engine. Higher engine performance is achieved by increasing the operating chamber pressure using a low pressure turbine pump now in final stages of development. No changes to any other systems are suggested. This simple approach will provide a payload increase of approximately 1500 pounds. This paper provides a description of engine modifications required to achieve higher performance. Particular emphasis is directed to the retention of proven qualified components and design approaches of the existing engine. The proposed modifications do not extend the state-of-the-art. They are straightforward, low-risk approaches. Author

N84-29926# Rocketdyne, Canoga Park, Calif.
LOX/CH4 FOR REUSABLE HIGH PERFORMANCE BOOSTER ENGINES c28
F. M. Kirby *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 253-260 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/9

This paper reviews characteristics of hydrocarbon fuels and presents rationale for a recommended selection of methane as the fuel for a future reusable, high-performance booster engine. Candidate engine power cycles are discussed and parametric data comparing engine operating conditions are presented. The impact of advanced technology on engine performance is discussed and the technology readiness level for liquid oxygen/methane is addressed. Author

N84-29927*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
HIGH PRESSURE LOX/NATURAL GAS STAGED COMBUSTION TECHNOLOGY c25
C. R. Bailey *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 261-274 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21B

A program was conducted to investigate ignition, combustion, and heat transfer characteristics of liquid oxygen and natural gas applicable to high pressure staged combustion rocket engines. A pressure-fed combustion system rated at 40,000 pound thrust at 3,000 psia chamber pressure was used for all testing. Preburner combustion data were obtained at pressures ranging from 1600 to

3100 psia and propellant mass mixture ratios from 0.27 to 0.44. Fuel-rich propellant ignition was accomplished but with difficulty. High mixture ratio, high temperature ignition excursions were required to prevent combustion quenching. Additional work will be required to obtain reliable preburner propellant ignition at temperatures sufficiently low to prevent turbine damage in engine systems. Thrust chamber heating rates were measured using a water-cooled calorimeter chamber. Heating rates were determined to be greater than predicted, and main injector outer-row elements were biased fuel-rich in a successful attempt to reduce heating. Testing was conducted to chamber pressures of 2100 psia using the calorimeter thrust chamber. Operation with greater flowrates and pressures using a liquid natural gas-cooled thrust chamber resulted in a decrease in combustion efficiency and an increase in nozzle throat heating rate. Author

N84-29928# Martin Marietta Aerospace, Denver, Colo.

MPD THRUSTER COMPARISONS WITH ADVANCED CHEMICAL SYSTEMS FOR AUXILIARY PROPULSION APPLICATIONS

L. K. Rudolph and G. M. Ogg *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 275-286 refs (For primary document see N84-29906 20-20)
(Contract F04611-82-C-0049)
Avail: NTIS HC A17/MF A01 CSCL 21/8

The self-field MPD thruster is capable of developing specific impulse levels of up to 5000 s with argon propellant. This high specific impulse suggests that the benefits of using MPD thruster systems for spacecraft auxiliary propulsion may be significant relative to more well-known chemical thruster systems. To evaluate these potential benefits, Air Force missions for the 1990-2000 time period were examined. Various chemical thruster systems were sized for these missions and compared to MPD thruster systems. These comparisons suggest that the launch masses of many future spacecraft can be significantly reduced by using MPD thruster systems. To confirm these results, a detailed MPD thruster system design was developed for a large space-based radar in geosynchronous orbit. The characteristics of this design were compared to a similar design for an advanced N2O4/MMH bipropellant thruster system. For these designs, the MPD thruster system is 46% less massive than the chemical system. The estimated life cycle cost of the MPD thruster system is only 62% of the chemical system cost. Finally, the small impulse bit of the MPD thruster system yields a significant improvement in the overall spacecraft pointing accuracy. Author

N84-29929# IAP Research, Inc., Dayton, Ohio.

OPTIMIZATION OF ELECTROMAGNETIC PROPULSION SYSTEMS

T. J. McCormick, A. Challita, and J. P. Barber *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 287-294 refs (For primary document see N84-29906 20-20)
(Contract F04611-82-C-0029)
Avail: NTIS HC A17/MF A01 CSCL 21/3

Electric propulsion systems are being considered for a variety of space missions. Electric thrusters of interest are the magnetoplasmadynamic (MPD), teflon pulsed plasma (TPP), pulsed inductive (PTI), and the electric rail gun (ERG). In this paper, the development of an optimization method is discussed that allows the major components of an electric propulsion system to be selected and sized such that the total propulsion system mass is minimized. Analysis of the results shows that operation of the thruster at its maximum efficiency point does not lead to an optimized propulsion system. B.W.

N84-29930# TRW Space Technology Labs., Redondo Beach, Calif.

THRUST BALANCE EFFICIENCY MEASUREMENTS FOR A PULSED INDUCTIVE THRUSTER

C. Lee Dailey and Ralph H. Lovberg *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 295-302 refs (For primary document see N84-29906 20-20)
(Contract F04611-82-C-0058)
Avail: NTIS HC A17/MF A01 CSCL 21/8

Preliminary thrust balance measurements of efficiency as a function of I sub sp are presented for a I-m diameter Pulsed Inductive Thruster using argon. The results appear to depend on mass loading, with Eta/I sub sp at a given capacitor voltage increasing as the injected mass is increased. The best performance, measured at 22 kV and 1.7 x 10 to the minus 5th power kg, was 28% at 1300 seconds. Further work to improve gas injection and to measure performance with miniature magnetic field and current density probes is planned for the near future. An estimate of drag make-up and LEO to GEO missions, using projected efficiencies, shows that 55 N (1.2 lb) of thrust could be delivered with a 430 kW propulsion module, and that orbit transfer to GEO could be done in 3 months for a 12,000 kg (26,400 lb) satellite. Author

N84-29931*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

FACTORS THAT INFLUENCE SPACE STATION PROPULSION REQUIREMENTS

W. W. Smith (Rocket Research Co., Redmond, Wash.), C. L. Wilkinson (Boeing Aerospace Co., Kent, Wash.), and M. E. Valgora *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 303-318 refs (For primary document see N84-29906 20-20)
(Contract NAS3-23353)
Avail: NTIS HC A17/MF A01 CSCL 21H

The manned space station major propulsion system requirements were outlined and the important influencing factors were defined. To accomplish these objectives, a range of configuration designs were defined and subjected to an environmental perturbation analysis over a range of altitudes. Sensitivities to design and operation were identified and top level propulsion system requirements defined. Conclusions and recommendations regarding operational altitude, configuration design, and ways to minimize the propellant requirements for the space station mission were discussed. A principal finding is that station modules and, more importantly, solar array configuration design, must be limited to strictly balanced or gravity gradient stable designs, otherwise propulsion and momentum system requirements will be unacceptably large. Author

N84-29932*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

COST EVALUATION OF SPACE STATION PROPULSION SYSTEM OPTIONS

R. W. Klemetson and P. W. Garrison *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 319-328 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21H

Alternative space station propulsion system options for a range of space station configurational and operational architectures were evaluated. The propulsion system options included H2 resistojets, low pressure gaseous oxygen/hydrogen, bipropellant N2O4/MMH, and augmented hydrazine. The primary evaluation criterion was the life cycle cost of the propulsion system which includes its development and operation in the space station system for ten years. Propulsion system mass, performance, reliability, and other relevant parameters were considered in the comparison of the candidate propulsion technologies. Parametric results are presented for a range of space station propulsion requirements that vary from these representative of a first generation station to those of an advanced station with a space-based orbital transfer vehicle. Space Transportation System costs were treated parametrically and are found to be a major consideration in evaluating the payoff of advanced propulsion system technology for space station. Advanced propulsion systems are shown to reduce space station operations costs by providing higher performance but also to require a larger front end investment for development and qualification. Low cost implementations of advanced technology must be developed if the full potential of such systems is to be realized. R.S.F.

N84-29933*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

AN INTEGRATED SPACE STATION PROPULSION SYSTEM
S. D. Rosenberg (Aerojet Techsystems Co., Sacramento, Calif.), D. C. Judd (Aerojet Techsystems Co., Sacramento, Calif.), and P. W. Garrison *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 329-338 ref (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21H

Oxygen/hydrogen propulsion system options for space station orbit maintenance and attitude control were developed and evaluated relative to monopropellant and storable bipropellant propulsion systems. Space station propulsion requirements were analyzed with reference to such considerations as station size, altitude, power, crew size, and orbit transfer vehicle and orbital maneuvering vehicle servicing requirements. The evolutionary growth of oxygen/hydrogen bipropellant propulsion as an integral part of several interrelated space station functions, e.g., life support, power, and thermal management was considered. Propellant resupply evolves from resupply based on transport of liquid oxygen and liquid hydrogen to water. The advantages of the operation of the space station based on an oxygen/hydrogen economy are presented and discussed. Author

N84-29934*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OXYGEN/HYDROGEN THRUSTERS FOR THE SPACE STATION AUXILIARY PROPULSION SYSTEMS
M. A. Appel, L. Schoenman, and D. K. Berkman *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 339-350 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21H

The status of a program to determine the feasibility and technology requirements of a low-thrust, high-performance, long-life gaseous oxygen/gaseous hydrogen thruster for space station propulsion was discussed. An existing igniter-injector was coupled with three different thrust chambers to acquire test data for the program. A stainless-steel chamber was used for test stand checkout, calibration, and propellant ignition studies. A regeneratively cooled thrust chamber was used to evaluate the feasibility of utilizing this method of cooling and to determine achievable performance. Because of off-design point operation, the cooling method was not proven. Vacuum performance achieved was 3616 N-s/kg (369 lbf-s/lbm) at the ODK optimum mixture of 2.5:1 and a chamber pressure of 207 kN/ sq m (30 psia). A high temperature rhenium thrust chamber was run at the same operating conditions for a total run duration of 2852 sec during 41 tests with no degradation of the walls. Vacuum performance achieved was 4020 N-s (410 lbf-s/lbm). A total of 115 tests were conducted with no instances of nonignition. Recommendations are presented to advance the feasibility and technology requirements evaluation. Author

N84-29935*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THRUST LEVEL REQUIREMENTS FOR SPACE STATION ON-ORBIT PROPULSION
R. W. Klemetson and J. C. Sercel *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 351-358 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21H

Thrust level requirements for the space station propulsion system were systematically evaluated for a range of possible space station configurations. Requirements addressed include orbit reboost or orbit maintenance and attitude control for disturbance correction. Constraints considered include acceleration limits imposed by structure and payloads, pointing requirements, reboost frequency, and allowable thrusting period. Results are presented parametrically and thrust level requirements for various space station architectures are specified. Author

N84-29936# Ford Aerospace and Communications Corp., Palo Alto, Calif.
THE LIQUID BIPROPELLANT STAGE CONCEPT: FILLING THE OTV GAP
V. A. Moseley *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 359-364 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

Space shuttle pricing policy brought propulsion performance and packaging implications into focus. The currently available or planned orbit transfer vehicles (PAM-A, PAM-D, PAM-DII, IUS, TOS, and Centaur G) offer a wide spectrum of approaches and payloads, but they leave a range of payloads between 1800 kg and 3500 kg in geosynchronous transfer orbit (GTO) which cannot be launched economically. Unfortunately, this range encompasses many commercial and military requirements. A high performance propulsion module (HPPM) designed to fill this shuttle OTV gap was developed. The reduction in Space Transportation System (STS) launch costs resulting from high specific impulse and a stage length of only 52 inches justifies the cost of this commercial development. The propulsion aspects of the trade studies that led to the selection of a bipropellant module that is three-axis stabilized using the satellite control electronics are outlined herein. R.S.F.

N84-29937*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROPULSION ISSUES FOR ADVANCED ORBIT TRANSFER VEHICLES
L. P. Cooper *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 365-378 refs Previously announced as N84-25762 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21H

Studies of the United States Space Transportation System show that in the mid to late 1990s expanded capabilities for orbital transfer vehicles (OTV) are needed to meet increased payload requirements for transporting materials and possibly men to geosynchronous orbit. Discussion and observations relative to the propulsion system issues of space basing, aeroassist compatibility, man ratability, and enhanced payload delivery capability are presented. These issues require resolution prior to the development of a propulsion system for the advanced OTV. The NASA program in support of advanced propulsion for an OTV is briefly described along with conceptual engine design characteristics. Author

N84-29938# Air Force Rocket Propulsion Lab., Edwards AFB, Calif.
AFRPL SOLAR-THERMAL ROCKET ACTIVITIES
C. C. Selph and G. J. Naujokas *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 379-384 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/8

Earth orbital maneuvers, particularly orbit raising, provide the most important and extensive propulsion tasks in space and are not ideally served by either chemical rockets with their comparatively low specific impulse (Isp) or electric rockets with their low thrust. Solar thermal propulsion was investigated previously as a potential way of filling of gap in propulsion capability. The concept makes use of concentrated sunlight to heat hydrogen for expansion through a converging-diverging nozzle. The payload advantages which accrue from the high Isp (over 800 seconds) in various mission scenarios were determined analytically and an investigation was launched to provide a demonstration and evaluation of the concept within the limits of a ground test facility. Alternative thruster concepts were also considered. R.S.F.

N84-29939# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md. Chemical Propulsion Information Agency.
THE 1984 JANNAF PROPULSION MEETING, VOLUME 2
Karen L. Strange, ed. Feb. 1984 326 p refs Meeting held in New Orleans, 7-9 Feb. 1984 5 Vol.
(Contract N00024-83-C-5301)
(AD-A143025; CPIA-Publ-390-Vol-2) Avail: NTIS HC A15/MF A01 CSCL 21/8

The Propulsion Meeting is sponsored by the Joint Army-Navy-NASA-Air Force (JANNAF) Interagency Propulsion Committee on an annual basis. The objective of the meeting is to promote the exchange of technical information among the organizations active in the fields of missile, space and gun propulsion technology. Topics covered include Space Shuttle propulsion, liquid propellant booster engines, satellite and space station attitude control systems, liquid oxidizer compatibility, and electric propulsion. Author and source indexes are included. For individual titles, see N84-29940 through N84-29965.

N84-29940# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.

FLUIDIC THRUST VECTOR CONTROL THRUSTER DEVELOPMENT

V. E. Haloulakos *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 1-10 refs (For primary document see N84-29939 20-20)

Avail: NTIS HC A15/MF A01 CSCL 21/8

A fluidically controlled nozzle, intended for a tactical missile thrust vector control (TVC), was designed and tested. The overall development was composed of three distinct tasks. The flow characterization task investigated the flow processes, established the sensitivity parameters, and determined the internal nozzle configuration using cold air. Successful flow switching was demonstrated with net TVC angles greater than + or - 20 deg. The dynamic response task established the control nozzle thrust deflection as a function of the frequency of command signals. Repeatable performance was obtained with pressures up to 2000 psia, driving frequencies up to 50 Hz, and a response of 10 to 15 msec. Deflection angles achieved were greater than + or - 20 degrees. The hot gas firings task verified that a nozzle could be fabricated from materials which can withstand 5000 F and thrust deflection angles greater than 20 deg could be achieved by the design that evolved from the flow characterization and the dynamic response tests. This TVC concept and nozzle can be used to control any rocket propelled vehicle that flies in the lower atmosphere. The pressure range tested with this nozzle demonstrated satisfactory performance for altitudes up to 8000 ft. With design modifications and further development, it may be possible to increase the range to higher altitudes. R.J.F.

N84-29941# Universal Propulsion Co., Phoenix, Ariz.

HISTORY OF AIRCRAFT ESCAPE SYSTEM PROPULSION c03

R. F. Sadler and E. B. Skinner (Talley Industries of Arizona, Inc.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 11-20 (For primary document see N84-29939 20-20)

Avail: NTIS HC A15/MF A01 CSCL 01/3

A brief history of the use of propulsive elements in aircrew escape systems is presented. Both closed propulsion elements (catapults), as well as rocket motors are considered since early ejector seats depended solely on catapults for their motive source. Applications of rocket motors other than for providing the main impetus to the escape system are also considered in more recent systems. Information was obtained from all types of literature both published and unpublished as well as from discussions with individuals who were involved in the escape system arena from its infancy. R.J.F.

N84-29942# Douglas Aircraft Co., Inc., Long Beach, Calif. Special Products Engineering.

PROPULSION IN A LIFE-SAVING ROLE FOR ACES 2 c03

R. G. McIntyre *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 21-32 (For primary document see N84-29939 20-20)

(Contract F33657-72-C-0379)

Avail: NTIS HC A15/MF A01 CSCL 01/3

The propulsion system for the ACES 2 high technology ejection seat consists of three solid propellant units: a main rocket catapult assembly to launch the seat from the cockpit and boost it into its desired trajectory (1,120 lb-sec impulse); a gyro-controlled vernier rocket to stabilize the seat in pitch (235 lb-sec); and a small roll rocket (22 lb-sec) to provide trajectory separation for multicrew applications. Design requirements of the propulsion system are examined along with specific physical and performance details of each unit. The operation of the complete ACES 2 system is described to show its demands upon propulsion. Finally, system performance information is presented to show that propulsion and system requirements were achieved, thus leading to the high life saving record of the ACES 2 ejection seat. R.J.F.

N84-29943# Stencel Aero Engineering Corp., Arden, N.C.

THE STENCEL S4S EJECTION SEAT: A STUDY IN NEW PYROTECHNIC DEVELOPMENTS c03

M. A. A. Hobbs *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 33-42 (For primary document see N84-29939 20-20)

Avail: NTIS HC A15/MF A01 CSCL 01/3

The development of a new generation ejection seat, the Stencel S4S, is discussed with particular reference to the propulsion and initiation systems and sub-systems. The reasons for development were to improve performance, to increase reliability, and to reduce both initial and life cycle costs. Design objectives were established which included yaw stability by means of dual fins mounted alongside the seat, which are extended mechanically and aerodynamically as the seat leaves the airplane during the ejection phase. The propulsion package consists of a twin tube catapult and twin rocket motors. Positive stability achieves increased tolerance to the 'eyeballs out' deceleration because a man can stand a greater level of deceleration when he is kept pointing directly into the relative airflow. R.J.F.

N84-29944# Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio. CREST Advanced Development Program Office.

CREST: CREW ESCAPE TECHNOLOGIES FOR THE 1990'S c03

A. M. Higgins and E. O. Roberts *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 43-48 refs (For primary document see N84-29939 20-20)

Avail: NTIS HC A15/MF A01 CSCL 01/3

An overview of the CREST Advanced Development Program is given. The CREST program's purpose is to develop and demonstrate an ejection seat that is a significant departure from traditional practice. This new ejection seat employed novel design approaches and advanced technologies to dramatically enhance the capabilities of the open ejection seat. Each of the new technologies incorporated into the CREST seat are discussed with emphasis placed on the need for continuous, conditional flight control. Particular emphasis is placed on the requirements for the seat's digital flight controller and its interaction with actuators such as selectable thrust, attitude control rockets. R.J.F.

N84-29945# Atlantic Research Corp., Gainesville, Va.

ENERGY MANAGEMENT FOR CREW ESCAPE SYSTEMS c03

M. G. Hubbell, C. W. Anderson, and W. H. Sargent *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 49-58 refs (For primary document see N84-29939 20-20)

(Contract F33615-83-C-3401)

Avail: NTIS HC A15/MF A01 CSCL 01/3

The operational envelope of modern and advanced combat aircraft has extended beyond the capabilities of current crew escape systems. To reverse the trends toward increasing numbers of fatalities and serious injuries during the ejection event, an energy management system capable of adapting the performance of the appropriate subsystem to the environment of the escape situation is investigated. The system will incorporate a real time microprocessor controller to receive, process, and transmit information, sensors to maintain aircraft, seat, and environmental conditions; and an adaptive propulsion system to provide forces and moments during ejection. R.J.F.

N84-29946# Talley Industries of Arizona, Inc., Mesa.

HIGH PERFORMANCE, LOW FLAME TEMPERATURE NITRAMINE PROPELLANT DEVELOPMENT c28

M. L. Moore, P. H. Graham, and N. H. Lundstrom (Lundstrom Technical Services, Tacoma, Wash.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 59-70 refs (For primary document see N84-29939 20-20)

Avail: NTIS HC A15/MF A01 CSCL 21/9

A family of castable, high performance gas generator propellants was developed to fulfill anticipated future weapon systems requirements. The propellant family included formulations exhibiting low flame temperatures and burning rates in the 0.2 - 0.5 ips regime. The developed formulations provide performance, mechanical property and ballistic improvements which significantly surpass those of conventional low flame temperature gas generator propellants. Based on the data obtained during the formulation of the three gas generator propellants several tentative conclusions can be drawn: ammonium perchlorate, in low concentrations, appears to be the most viable approach to modifying the ballistics of the organic oxidized/energetic binder propellants examined; at low plasticizer to polymer ratios ($<$ 1.0) conventional nitrate ester catalysts have little effect on propellant ballistics; triaminoguanidinium nitrate (TAGN) particle size has a dramatic effect on propellant burning rate since as the particle size decreases the propellant burning rate increases; and the substitution of cooler organic cooxidizers, with the exception of fine TAGN, for HMX has little effect on propellant burning rates but does significantly reduce flame temperature. R.J.F.

N84-29947# Morton Thiokol, Brigham City, Utah.
NITRATE ESTER POLYETHER GLYCOL PREPOLYMERS c27
G. E. Manser *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 71-74 refs (For primary document see N84-29939 20-20)
(Contract N00014-82-C-0800)
Avail: NTIS HC A15/MF A01 CSCL 11/3

The synthesis of nitrate ester polyether glycols by the cationic polymerization of nitrate ester substituted cyclic ethers is demonstrated. The monomers were readily prepared by the anhydrous nitration of the corresponding hydroxy substituted cyclic ether. Polymerization initiated by boron trifluoride and butanediol yield polymers that were readily curable by isocyanates. Extensive characterization and testing showed these polymers to be thermally stable and compatible with propellant formulation components. Preliminary propellant mixes were made and burn rate data were measured. R.J.F.

N84-29948# Morton Thiokol, Brigham City, Utah.
DEVELOPMENT AND FABRICATION OF A GRAPHITE/EPOXY MOTOR CASE FOR AIR LAUNCH MISSILE APPLICATIONS
Nathan Christensen and Edward Wolcott *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 75-86 (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/8

A derivative of a rocket motor which was developed in the 1960s for use as a space launch vehicle was used as an upper stage of a two stage air launch missile. It is shown that a graphite/epoxy motor case offers advantages, such as higher velocity, greater range and altitude and greater strength and stiffness, over the fiberglass/epoxy case. The motor case was redesigned with T300 graphite replacing S-901 fiberglass and demonstrated a 17.7% weight savings. The graphite/epoxy structure was more favorable to the motor's low temperature operation since the higher stiffness and lower thermal growth of graphite/epoxy reduced propellant stresses during low temperature motor operation. The insulated case was fabricated utilizing a common sodium silicate sand mandrel for both the insulator and the composite case. It is found that the use of a common mandrel significantly reduces tooling costs relative to the conventional separate mandrel approach. E.A.K.

N84-29949# Morton Thiokol, Brigham City, Utah.
CHARACTERIZATION OF FILAMENT WOUND KEVLAR AND GLASS COMPOSITES FOR ROCKET MOTOR APPLICATIONS
A. K. Munjal, S. B. Kulkarni, and H. S. Starrett (Southern Research Inst., Birmingham, Ala.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 87-96 refs (For primary document see N84-29939 20-20)
(Contract F04704-83-C-0001)
Avail: NTIS HC A15/MF A01 CSCL 21/8

The characterization of some of the common composite [illegible] materials in use in the rocket motor industry is reported. These materials are filament wound oven cured, and the process could effect the mechanical properties as compared to the aircraft type autoclave cured layup approach. The state of the art test methods for characterization were identified, the effect of fiber orientation, test methods and temperature on properties were determined; all orthotropic elastic constants for use in composite finite element analyses were characterized; and correlation between predicted and measured properties was established. Four material systems were characterized: Kevlar 49, DC-20 release coated Kevlar 49, S-2 glass and 341 style S-2 glass cloth. The epoxy system was the rigid anhydride Bis-A-Epoxy with a Young's modulus of 410 ksi. Kevlar specimen preparation posed some challenges. Laser cutting had to be used over water jet or conventional machining to yield adequate samples. Tension testing of coupons and hoop wound rings gave equivalent data. A correlation between stiffness changes as a function of orientation and classical lamination theory was obtained. Comparison of data obtained with various shear methods shows that the 10 deg off axis laminates yield higher shear modulus and lower shear strength than hoop wound tubes. Thermal conductivity and coefficient of thermal expansion data are also generated. The common problems with respect to testing composites are discussed. E.A.K.

N84-29950# Atlantic Research Corp., Gainesville, Va.
A TRACTABLE THEORY FOR NONLINEAR PROPELLANT RESPONSE AND CUMULATIVE DAMAGE PREDICTIONS c28
A. J. Mikeska *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 97-106 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/9

Cumulative damage, as calculated by Miner's law for the summation of damage fractions, was used to predict failure in solid propellant rocket grains. The particular form of Miner's law, can be physically justified by analogy to the theory of absolute reaction rates and predicting specimen failures. To implement a stress based cumulative damage law, the stress time histories which occur in the critical regions of a rocket motor grain are predicted. A theory which couples cumulative damage to propellant stress response, which enables the simultaneous calculation of nonlinear stress time and damage time histories for thermal and/or mechanical loadings are described. The propellant data required for the theory are extracted from a broad spectrum tensile characterization of the propellant or of the bond system to analyze the grain interface region. The solution method is automated and is relatively simple to use. The theory reproduces constant strain rate stress time curves, including the failure points, and is used to predict unsuccessful thermal cycling of analogue motors and SEC's. E.A.K.

N84-29951# United Technologies Corp., San Jose, Calif.
NONLINEAR STRUCTURAL CHARACTERIZATION OF SOLID PROPELLANTS
E. C. Francis and W. M. Fisher *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 107-116 refs (For primary document see N84-29939 20-28)
(Contract F04611-80-C-0052)
Avail: NTIS HC A15/MF A01 CSCL 21/9

A method to characterize the behavior of solid propellants was developed. The approach is based on a constitutive law which corrects a viscoelastic expression with a stress softening function. From uniaxial test data, the propellants nonlinear behavior was characterized in terms of the softening function. The method shows significant improvement over past approaches in that expressions for damage during unloading, relaxation and reloading are defined separately as normalizing functions to the past maximum stress. Predictions for complex histories are made by this approach and close agreement between measured and predicted stresses is obtained. E.A.K.

N84-29952# Olin Corp., Marion, Ill.
COMBUSTION OF GAP, PART 1 c25

Indu B. Mishra, G. P. Juneau, and Ted Groom *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 117-132 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/2

Pyrolysis products of glycidyl azide polymer (GAP) were studied. Decomposition products were analyzed by gas chromatography and mass spectrometry (GCMS). It was found that although GAP loses atomic nitrogen, extensive ion-molecule reactions occur to form stable products. Increasing the combination temperature results in increased HCH. The following decomposition products were identified: methane, nitrogen, ethylene, ethane, water, hydrogen cyanide, propene nitrile, acetaldehyde, ethylene oxide, carbon dioxide, propene, acetonitrile, 2-propene nitrile, formamide, acetamide, acetone, benzene, pyrole, furan, pyridine, benzonitrile, pipperidines, propylene oxide, and butadiene. E.A.K.

N84-29953# Garrett Corp., Phoenix, Ariz. Pneumatic Systems Div.

A TURBOMECHANICAL THRUST VECTOR CONTROL FOR ADVANCED INTERCONTINENTAL BALLISTIC MISSILES

Chase Trowbridge *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 133-142 (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/8

A turbomechanical thrust vector control (TVC) system for strategic missiles, was improved and tested. It is indicated that the system is equivalent to a hydraulic system in performance and reliability and potentially superior in packageability, long term storage, and resistance to temperature effects. E.A.K.

N84-29954# Olin Corp., Marion, Ill. Ordnance Products.

DEVELOPMENT OF GAP-TAGN-PEG PROPELLANTS. PART 1: STUDY OF INGREDIENTS

Indu B. Mishra, D. E. Rickenbaugh, C. I. Ashmore, A. K. Mehrotra, J. Emery Schring (Olin Research Center, New Haven, Conn.), and E. Rothgary (Olin Research Center, New Haven, Conn.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 143-154 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/8

Structural fatigue of large filament wound Kevlar-49/epoxy motor cases due to loaded motor sustained vibration testing at high axial loads has largely been ignored as a design criterion on solid rocket motor programs for strategic or space applications. The Sinusoidal vibration tests of a 92-in. loaded motor for 400 cycles at structural loads approaching 60% of static design load levels, Chemical Systems (CSD) conducted fatigue tests in tension/tension and tension/compression on specimens cut from a 3 1/2-year-old 92-in. expended IUS motor case are reported. The results of these tests and the subsequent analysis and conclusions are presented. E.A.K.

N84-29955# United Technologies Corp., San Jose, Calif. Chemical Systems.

KEVLAR-49/EPOXY CASE SKIRT STRUCTURAL FATIGUE STRENGTH c28

H. M. Reynolds and R. R. Hood *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 155-182 Prepared for Hughes Aircraft Co., Los Angeles (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/9

Glycidyl azide polymer (GAP) related propellants were studied. A polymer blend of GAP and polyethylene glycol was used because cured GAP alone possess poor mechanical properties. Nitroplasticizers are avoided. The GAP-AN-TAGN-PEG with GN, guanidine nitrate, blends offer fast burning, low flame temperature propellant alternatives. Hazards were evaluated for GAP and TAGN, Triaminoguanidine nitrate, using Accelerating Rate Calorimetry (ARC). It is indicated that self heating rate of GAP in well insulated 10,000 gallon tank cars at 105-106 C is manageable for 22 days and becomes uncontrollable after 23 days. The GAP still shows gassing which is a potential problem. The TAGN shows a self heating rate of 0.01 C/min at 60 C. E.A.K.

N84-29956# Olin Corp., Marion, Ill. Ordnance Products.

SYNTHESIS OF DIAZIDODIESTERS c28

A. K. Mehrotra and Indu B. Mishra *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 183-198 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/9

Five diazidodiesters were synthesized. These diazidodiesters reduce the flame temperature and act as energetic plasticizers in solid propellants. When inert plasticizers are replaced with these energetic plasticizers, the flame is reduced in the propellant exhaust gases. The diazidodiesters are synthesized in two steps: (1) syntheses of dichlorodiesters by the acid catalyzed condensation of one mole of a dicarboxylic acid with two moles of dichloroalcohols, followed by, (2) the reaction of the dichlorodiester with sodium azide. These diazidodiesters are all liquids with melting points well below -25 C and are expected to improve the low temperature stress-strain characteristics of solid propellants. The compounds are characterized by elemental analysis and by spectroscopic techniques. E.A.K.

N84-29957# United Technologies Corp., San Jose, Calif. Chemical Systems Div.

STRESS TRANSDUCER INTERPRETATION ANALYSIS AND STABILITY DATA c35

E. C. Francis and R. E. Thompson *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 199-210 refs (For primary document see N84-29939 20-20)
(Contracts F04611-75-C-0042; F04611-79-C-0019)
Avail: NTIS HC A15/MF A01 CSCL 14/2

A semi-conductor strain gage transducer was developed for use in measuring stress in solid propellant grain rocket motors. The requirements for survival and performance are such that the sensor has direct use as a general pressure transducer especially where small size and high reliability are a requirement. The design work, gage interpretation analysis and some long-term stability results are summarized. Design of this reliable stress transducer for embedment in a solid propellant rocket motor has utilized finite element structural analysis to minimize the stress disturbance above the transducer body and to reduce diaphragm interaction with the nonlinear viscoelastic solid propellant. Minimizing the interaction between solid propellant and transducer diaphragm required that the transducer body and flexural diaphragm be much stiffer than conventional pressure transducers. M.G.

N84-29958# Aerojet Strategic Propulsion Co., Sacramento, Calif.

A NDT IGNITION DELAY PREDICTIVE TOOL c25

L. A. Howell and S. W. Jang *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 211-218 (For primary document see N84-29939 20-20)
(Contract F42600-81-C-4713)
Avail: NTIS HC A15/MF A01 CSCL 21/2

Recent studies have indicated that the stoichiometry between the oxidizer and the fuel at the surface of ANB-3066 propellant has a strong influence on the ignition properties of the propellant. The use of an ignition delay tool to predict propellant ignitability under conditions similar to those in a rocket motor during ignition is described. This device will ultimately be used as a gage to predict degrees of ignition delay in motors out in the field. This is accomplished by igniting a small propellant sample from the actual motor in the predictive tool. Prediction is based upon correlating the ignition characteristics of the motor sample with baseline ignition characteristics. The baseline characterization includes various degrees of ignition delay as a function of changes in oxidizer/fuel stoichiometry at the surface of ANB-3066 propellant caused by temperature, humidity, and surface anomalies. The test results will be used to develop a kinetic model of the process in order to predict motor service life. Author

N84-29959# Aerojet Technical Systems Co., Sacramento, Calif.

LOW COST MANUFACTURING OF TACTICAL ROCKET MOTORS

W. W. Sobol *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 219-226 (For primary document see N84-29939 20-20)

20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/8

Low cost manufacturing approaches for tactical rocket motors are presented. A typical high rate rocket motor production program is described and examples are given of the various manufacturing and inspection steps used in its manufacture. Automated and semi-automated grit blasting, lining, mixing, casting, curing, and inspection facilities and equipment are described and typical cost savings incurred through the use of this special equipment are presented. Author

N84-29960# Akron Univ., Ohio. Inst. of Polymer Science.
DURABILITY OF ADHESIVE BONDS WITH IONIC BONDS AT THE INTERFACE **c27**
P. Dreyfuss and F. Liang *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 227-234 refs (For primary document see N84-29939 20-20)
(Contract N00014-76-C-0408)
Avail: NTIS HC A15/MF A01 CSCL 11/1

The durability of polybutadiene-polyurethane joints to glass or metals in water at room and elevated temperatures was studied. The effects of silane pretreatment of the surface and of surface morphology on adhesion were examined. The durability of the joint was related to the number of chemical bonds that could form between the polyurethane and the surface and to the type of surface treatment given to the surface. Proper treatment led to significant enhancement of durability of the joints. The polyurethane was prepared from ARCO's hydroxyterminated polybutadiene (R-45HT), toluene diisocyanate (TDI), trimethylolpropane (triol), and N,N-bis(2-hydroxypropyl)aniline (BHPA). Author

N84-29961# Naval Weapons Center, China Lake, Calif. Chemistry Div.
INTERFACIAL INTERACTION AND ADHESION IN COMPOSITE MATERIALS **c34**
R. Y. Yee and E. C. Martin *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 235-240 refs (For primary document see N84-29939 20-20)
(SR02403001)
Avail: NTIS HC A15/MF A01 CSCL 11/4

The interfacial interaction of composites plays an important role in the properties of material such as structural materials, solid propellants, and explosives. To study the interfacial interaction, surface and interfacial free energies were investigated. The wettability of solids was determined by the Wilhelmy plate method using a series of reference liquids. The surface free energies of these solids were calculated from the wettability data using different models for determining the surface free energies. The surface free energies and interfacial free energies of a high energy material, cyclotrimethylenetrinitramine (RDX) and several matrix polymers were determined. The adhesion between each pair can be predicted from their interfacial free energies. The critical fracture stress of the filler-matrix interface was also predicted using the modified Griffith model. Author

N84-29962# Marquardt Corp., Van Nuys, Calif.
FIREBOLT DERIVATIVE/RAMJET ENGINE FEASIBILITY INVESTIGATION (CORE ENGINE PROGRAM): PROGRAM SUMMARY
J. L. Wood, J. G. Bendot, and R. K. Dunlop *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 241-250 Prepared for Teledyne Ryan Aeronautical Co., San Diego, Calif. (For primary document see N84-29939 20-20)
(Contract N00019-83-C-0111)
Avail: NTIS HC A15/MF A01 CSCL 21/8

The objective of this program was to conduct analyses and testing to define the performance and structural characteristics of a core engine derivative of the MA215 FIREBRAND Ramjet Engine. The goal is to demonstrate that the risk associated with development of a low-cost engine to power a Firebolt Derivative System can be minimized through use of the ramjet engine technology developed during the FIREBRAND program. An 18-inch diameter version of the 22-1/2 inch diameter FIREBRAND normal shock inlet ramjet was configured, using the pilot can and inner flameholder/manifold of that engine. Test emphasis was on a Mach 2.5, sea level flight regime, with the engine thermal/structural concept oriented to survive this severe environment. The feasibility of a low-cost ramjet engine to meet potential target requirements in a supersonic (Mach 1.8 to 2.5) low altitude (S.L. to 20,000 ft) flight environment was conclusively demonstrated. M.G.

N84-29963# Northwestern Univ., Evanston, Ill. Dept. of Mechanical Engineering.
ORGANIC AZIDES AS JET FUEL ADDITIVES: SYNTHESIS OF AZIDES AND MICRO-EXPLOSION CHARACTERISTICS OF DROPLETS **c28**
C. K. Law, C. H. Wang, L. C. Clausen, A. Lee, R. M. Moriarty, B. R. Bailey, S. C. Engerer, and R. S. Miller (ONR, Arlington, Va.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 251-260 refs Prepared in cooperation with Illinois Univ., Chicago (For primary document see N84-29939 20-20)
(Contracts N00014-83-K-0207; N00014-83-K-0306)
Avail: NTIS HC A15/MF A01 CSCL 21/4

The chemical formulation and quantification of organic azides and the experimental investigation combustion and explosion characteristics of droplets of fuel/azide mixtures are discussed. Experimental results demonstrate that the presence of azido additives can cause the fuel droplet to catastrophically disintegrate. This micro-explosion event significantly enhances fine-scale mixing as a result of secondary droplet dispersion, and also slightly shortens the droplet lifetime and thereby increases the intensity of the heat release rate. The alkyl azides synthesized for these studies consist of low molecular weight compounds such as isopropyl and isobutyl azides, low molecular weight diazido alcohols such as 1,3-diazido 2-propanol and azido and diazido silyl ethers. Other systems which were synthesized are novel vinyl diazides and dimethysilyldiazide. Higher molecular weight alkyl azides under investigation include norbornyl diazide and dimethyl diazidomalonate. M.G.

N84-29964# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.
AERODYNAMIC AND PROPULSION TEST UNIT (APTU) PERFORMANCE WITH A VITIATED AIR HEATER **c09**
R. H. Burt, D. W. Stallings, and M. Swillum (AEDC) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 261-270 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 14/2

The Aerodynamic and Propulsion Test Unit (APTU) at Arnold Engineering Development Center, Arnold AFS, Tennessee, has been equipped with a newly installed vitiated, or instream combustion, air heater (VAH). The facility operates in the blowdown mode, and the VAH supplies the enthalpy required to match atmospheric temperatures over a wide range of Mach numbers and altitudes. Initial shakedown tests and a rocket/ramjet test program have been completed. Complete descriptions of the facility and subsystems are included along with typical results from the shakedown tests demonstrating present capabilities of the facility. The test results include gas-sampling measurements of the vitiated test medium and show the unique capabilities of the completely computer-controlled facility. This capability is particularly important since a renewed interest in ramjets is at hand, and further utility of the facility is being planned for materials evaluation and other aerothermodynamic testing. Planned improvements of the facility are also discussed. Author

N84-29965*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SPACE SHUTTLE ORBITER IMPROVED AUXILIARY POWER UNIT
D. W. Hagemann, L. L. Wicklund, G. R. Loken, J. R. Baughman, and R. J. Lance *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 315-326 Prepared in cooperation with Sundstrand Energy Systems, Rockford, Ill. and Rockwell International Corp., Downey, Calif. (For primary document see N84-29939 20-20)

Avail: NTIS HC A15/MF A01 CSCL 21H

The Space Shuttle Orbiter Auxiliary Power Unit subsystem has operated successfully on three vehicles by meeting mission requirements and has proven the design for space operation. The current Auxiliary Power Unit (APU) operational life is limited to 12 missions and the APU turnaround between flights is longer than originally anticipated. The improved APU objective is to increase life to 50 missions, reduce the three - APU subsystem vehicle weight by 140 lbs., and reduce turnaround time. The design changes incorporated into the improved APU and the associated development testing are described. Author

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N84-29966# Texas A&M Univ., College Station. Dept. of Chemistry.
MACROCYCLES CONTAINING TIN. SYNTHESIS AND STRUCTURE OF 1,10-DIPHENYL-1,10-DISTANNABICYCLE (8.8.8) HEXACOSANE
M. Newcomb, M. T. Blanda, Y. Azuma, and T. J. Delord 2 Jul. 1984 12 p
(Contract N00014-79-C-0584)
(AD-A142703) Avail: NTIS HC A02/MF A01 CSCL 07/3

Synthetic methods used for the preparation and purification of the title compound, a representative member of a new class of compounds, are reported. The macrobicycle employs tin atoms as bridgeheads in a manner analogous to the nitrogen atoms of a cryptand. The molecular and crystal structure of the macrobicycle were determined by X-ray crystallography, and the positional and thermal parameters and bond distances are reported. Author (GRA)

N84-29967# Energetics, Inc., Columbia, Md.
SURVEY AND ANALYSIS OF MATERIALS RESEARCH AND DEVELOPMENT AT SELECTED FEDERAL LABORATORIES
J. E. Reed and C. R. Fink Apr. 1984 145 p refs Prepared for Pacific Northwest Lab., Richland, Wash.
(Contract DE-AC06-65RL-01830)
(DE84-008904; PNL-5061) Avail: NTIS HC A07/MF A01

The results of an effort to transfer existing, but relatively unknown, materials R and D from selected federal laboratories to industry are discussed. More specifically, recent materials-related work at seven federal laboratories potentially applicable to improving process energy efficiency and overall productivity in six energy-intensive manufacturing industries was evaluated, catalogued, and distributed to industry representatives to gauge their reaction. Laboratories surveyed include: Air Force Wright Aeronautical Laboratories Material Laboratory, Pacific Northwest Laboratory, National Aeronautics and Space Administration Marshall Space Flight Center, Oak Ridge National Laboratory, Brookhaven National Laboratory, Idaho National Engineering Laboratory, and Jet Propulsion Laboratory. Industries included in the effort are: aluminum, cement, paper and allied products, petroleum, steel and textiles. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N84-29968*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RAPID ADHESIVE BONDING CONCEPTS
B. A. Stein, J. R. Tyeryar, and W. T. Hodges Jun. 1984 74 p refs
(NASA-TM-86256; NAS 1.15:86256) Avail: NTIS HC A04/MF A01 CSCL 11D

Adhesive bonding in the aerospace industry typically utilizes autoclaves or presses which have considerable thermal mass. As a consequence, the rates of heatup and cooldown of the bonded parts are limited and the total time and cost of the bonding process is often relatively high. Many of the adhesives themselves do not inherently require long processing times. Bonding could be performed rapidly if the heat was concentrated in the bond lines or at least in the adherends. Rapid adhesive bonding concepts were developed to utilize induction heating techniques to provide heat directly to the bond line and/or adherends without heating the entire structure, supports, and fixtures of a bonding assembly. Bonding times for specimens are cut by a factor of 10 to 100 compared to standard press bonding. The development of rapid adhesive bonding for lap shear specimens (per ASTM D1003 and D3163), for aerospace panel bonding, and for field repair needs of metallic and advanced fiber reinforced polymeric matrix composite structures are reviewed. Author

N84-29969*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ACEE COMPOSITE STRUCTURES TECHNOLOGY: REVIEW OF SELECTED NASA RESEARCH ON COMPOSITE MATERIALS AND STRUCTURES
Washington Aug. 1984 181 p refs Conf. held in Seattle, 13-16 Aug. 1984
(NASA-CP-2321; L-15834; NAS 1.55:2321) Avail: NTIS HC A09/MF A01 CSCL 11D

The NASA Aircraft Energy Efficiency (ACEE) Composite Primary Aircraft Structures Program was designed to develop technology for advanced composites in commercial aircraft. Research on composite materials, aircraft structures, and aircraft design is presented herein. The following parameters of composite materials were addressed: residual strength, damage tolerance, toughness, tensile strength, impact resistance, buckling, and noise transmission within composite materials structures. For individual titles, see N84-29970 through N84-29977.

N84-29970*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESIDUAL-STRENGTH TESTS OF L-1011 VERTICAL FIN COMPONENTS AFTER 10 AND 20 YEARS OF SIMULATED FLIGHT SERVICE
Osvaldo F. Lopez *In its* ACEE Composite Struct. Technol. Aug. 1984 p 1-16 refs (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

Part of the NASA/ACEE Program was to determine the effect of long-term durability testing on the residual strength of graphite-epoxy cover panel and spar components of the Lockheed L-1011 aircraft vertical stabilizer. The results of these residual strength tests are presented herein. The structural behavior and failure mode of both cover panel and spar components were addressed, and the test results obtained were compared with the static test results generated by Lockheed. The effect of damage on one of the spar specimens was described. R.S.F.

N84-29971*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WORLDWIDE FLIGHT AND GROUND-BASED EXPOSURE OF COMPOSITE MATERIALS
H. Benson Dexter and Donald J. Baker *In its* ACEE Composite Struct. Technol. Aug. 1984 p 17-50 refs (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

The long-term durability of those advanced composite materials which are applicable to aircraft structures was discussed. The composite components of various military and commercial aircraft and helicopters were reviewed. Both ground exposure and flight service were assessed in terms of their impact upon composite structure durability. The ACEE Program is mentioned briefly. R.S.F.

N84-29972*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISON OF TOUGHENED COMPOSITE LAMINATES

USING NASA STANDARD DAMAGE TOLERANCE TESTS
Jerry G. Williams, T. Kevin OBrien (Army Structures Lab.), and A. J. Chapman, III *In its* ACEE Composite Struct. Technol. Aug. 1984 p 51-74 refs (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

The proposed application of composite materials to transport wing and fuselage structures prompted the search for tougher materials having improved resistance to impact damage and delamination. Several resin/graphite fiber composite materials were subjected to standard damage tolerance tests and the results were compared to ascertain which materials have superior toughness. In addition, test results from various company and NASA laboratories were compared for repeatability. R.S.F.

N84-29973*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SYNTHESIS AND TOUGHNESS PROPERTIES OF RESINS AND COMPOSITES
Norman J. Johnston *In its* ACEE Composite Struct. Technol. Aug. 1984 p 75-96 refs (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

Tensile and shear moduli of four ACEE (Aircraft Energy Efficiency Program) resins are presented along with ACEE composite material modulus predictions based on micromechanics. Compressive strength and fracture toughness of the resins and composites were discussed. In addition, several resin synthesis techniques are reviewed. R.S.F.

N84-29974*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TENSILE STRENGTH OF COMPOSITE SHEETS WITH UNIDIRECTIONAL STRINGERS AND CRACK-LIKE DAMAGE
C. C. Poe, Jr. *In its* ACEE Composite Struct. Technol. Aug. 1984 p 97-112 refs (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

The damage tolerance characteristics of metal tension panels with riveted and bonded stringers are well known. The stringers arrest unstable cracks and retard propagation of fatigue cracks. Residual strengths and fatigue lives are considerably greater than those of unstiffened or integrally stiffened sheets. The damage tolerance of composite sheets with bonded composite stringers loaded in tension was determined. Cracks in composites do not readily propagate in fatigue, at least not through fibers. Moreover, the residual strength of notched composites is sometimes even increased by fatigue loading. Therefore, the residual strength aspect of damage tolerance, and not fatigue crack propagation, was investigated. About 50 graphite/epoxy composite panels were made with two sheet layups and several stringer configurations. Crack-like slots were cut in the middle of the panels to simulate damage. The panels were instrumented and monotonically loaded in tension to failure. The tests indicate that the composite panels have considerable damage tolerance, much like metal panels. The stringers arrested cracks that ran from the crack-like slots, and the residual strengths were considerably greater than those of unstiffened composite sheets. A stress intensity factor analysis was developed to predict the failing strains of the stiffened panels. Using the analysis, a single design curve was produced for composite sheets with bonded stringers of any configuration. Author

N84-29975*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
IMPACT DYNAMICS RESEARCH ON COMPOSITE TRANSPORT STRUCTURES
Huey D. Carden *In its* ACEE Composite Struct. Technol. Aug. 1984 p 113-136 refs (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

The experimental and analytical efforts being undertaken to investigate the response of composite and aluminum structures under crash loading conditions were reviewed. A Boeing 720 airplane was used in the controlled-impact demonstration test. Energy absorption of composite materials, the tearing of fuselage skin panels, the friction and abrasion behavior of composite skins, and the crushing behavior and dynamic response of composite beams were among the topics addressed. R.S.F.

N84-29976*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POSTBUCKLING BEHAVIOR OF GRAPHITE-EPOXY PANELS
James H. Starnes, Jr., John N. Dickson (Lockheed-Georgia Co.), and Marshall Rouse *In its* ACEE Composite Struct. Technol. Aug. 1984 p 137-160 refs (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

Structurally efficient fuselage panels are often designed to allow buckling to occur at applied loads below ultimate. Interest in applying graphite-epoxy materials to fuselage primary structure led to several studies of the post-buckling behavior of graphite-epoxy structural components. Studies of the postbuckling behavior of flat and curved, unstiffened and stiffened graphite-epoxy panels loaded in compression and shear were summarized. The response and failure characteristics of specimens studied experimentally were described, and analytical and experimental results were compared. The specimens tested in the studies described were fabricated from commercially available 0.005-inch-thick unidirectional graphite-fiber tapes preimpregnated with 350 F cure thermosetting epoxy resins. R.S.F.

N84-29977*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STUDIES OF NOISE TRANSMISSION IN ADVANCED COMPOSITE MATERIAL STRUCTURES
Louis A. Roussos, Michael C. McGary, and Clemans A. Powell *In its* ACEE Composite Struct. Technol. Aug. 1983 p 161-178 (For primary document see N84-29969 20-24)
Avail: NTIS HC A09/MF A01 CSCL 11D

Noise characteristics of advanced composite material fuselages were discussed from the standpoints of applicable research programs and noise transmission theory. Experimental verification of the theory was also included. R.S.F.

N84-29978*# Lockheed-California Co., Burbank.
A STUDY OF STIFFNESS, RESIDUAL STRENGTH AND FATIGUE LIFE RELATIONSHIPS FOR COMPOSITE LAMINATES
J. T. Ryder and F. W. Crossman Oct. 1983 576 p refs
(Contract NAS1-16406)
(NASA-CR-172211; NAS 1.26:172211) Avail: NTIS HC A25/MF A01 CSCL 11D

Qualitative and quantitative exploration of the relationship between stiffness, strength, fatigue life, residual strength, and damage of unnotched, graphite/epoxy laminates subjected to tension loading. Clarification of the mechanics of the tension loading is intended to explain previous contradictory observations and hypotheses; to develop a simple procedure to anticipate strength, fatigue life, and stiffness changes; and to provide reasons for the study of more complex cases of compression, notches, and spectrum fatigue loading. Mathematical models are developed based upon analysis of the damage states. Mathematical models were based on laminate analysis, free body type modeling or a strain energy release rate. Enough understanding of the tension loaded case is developed to allow development of a proposed, simple procedure for calculating strain to failure, stiffness, strength, data scatter, and shape of the stress-life curve for unnotched laminates subjected to tension load. E.R.

N84-29979# Department of Energy, Washington, D. C.
ELECTROPOSITIVE BIVALENT METALLIC ION UNSATURATED POLYESTER COMPLEXED POLYMER CONCRETE Patent Application
Toshifumi Sugama, Lawrence E. Kukacka, and William H. Horn, inventors (to DOE) Filed 13 May 1983 23 p
(Contract DE-AC02-76CH-00016)
(DE84-011060; US-Patent-Appl-SN-494484) Avail: NTIS HC A02/MF A01

Quick setting polymer concrete compositions are described which are mixtures of unsaturated polyesters and crosslinking monomers together with appropriate initiators and promoters in association with aggregate which may be wet and a source of bivalent metallic ions which will set to polymer concrete with excellent structural properties. DOE

N84-29980# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction des Materiaux.
RESIDUAL CURING STRESS OF CARBON-RESIN COMPOSITES [LES CONTRAINTES RESIDUELLES DE CUISSON DANS LES COMPOSITES CARBONE-RESINE]
S. Carretero and J. P. Favre Feb. 1984 48 p refs In FRENCH
(Contract DRET-83.34.B3)
(ONERA-RT-6/3521-M) Avail: NTIS HC A03/MF A01

The origins of residual curing stress (RCS) in carbon-resin composites are reviewed. Micro and macroscopic effects of RCS are outlined. The effects of humidity and resin viscoelasticity on RCS are summarized. Calculation of uni and multidirectional RCS is treated. Experimental evaluation of RCS is described (photoelastometry, extensometry, stress-deformation curves, X-ray diffraction). Author (ESA)

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N84-29981# Oakland Univ., Rochester, Mich. Dept. of Chemistry.
THE TRANSFER OF ATOMS, IONS AND MOLECULAR GROUPS IN SOLUTION. PART 1: MODELS AND LIMITS
P. P. Schmidt 30 Oct. 1983 31 p 3 Vol.
(Contract N00014-77-C-0293)
(AD-A142333; TR-12) Avail: NTIS HC A03/MF A01 CSCL 07/4

The theory of the activated complex, as formulated by Marcus, is applied to the transfer in condensed phases of atoms, ions and molecular groups. Particular attention is given to reactions which take place in the diabatic limit. A Born-Oppenheimer-Holstein separation is developed in order to separate the degrees of freedom of the reactive subsystem from those of the environment; perturbations which can drive the reaction in the diabatic limit are identified. An analysis of a simple system is carried out. The system is two-dimensional and consists of a lithium cation which migrates (via activation) from one site of solvation to another. GRA

N84-29982# Oakland Univ., Rochester, Mich. Dept. of Chemistry.
THE TRANSFER OF ATOMS, IONS AND MOLECULAR GROUPS IN SOLUTION. PART 2: TUNNELLING BETWEEN HARMONIC WELLS
P. P. Schmidt 30 Oct. 1983 14 p 3 Vol.
(Contract N00014-77-C-0293)
(AD-A142334; TR-13) Avail: NTIS HC A02/MF A01 CSCL 20/12

The use of a harmonic-oscillator model is considered to investigate the tunneling of atoms, ions and molecular groups between positions of equilibrium for systems in condensed phases. The use of the oscillator model is warranted in many instances for which one has reasonably accurate information about the vibrational frequencies of atoms or molecular groups together with information about the distance over which the species transfers. Thus, the harmonic-oscillator model can be used in the absence of more complete information to make estimates of the rates of various kinds of heavy-center transfers in solution. In this paper we present a general treatment for the determination of the tunnel factors which are involved in the transfer. GRA

N84-29983# Oakland Univ., Rochester, Mich. Dept. of Chemistry.
THE TRANSFER OF ATOMS, IONS AND MOLECULAR GROUPS IN SOLUTION. PART 3: MONTE CARLO METHODS FOR THE EVALUATION OF RATE CONSTANTS
P. P. Schmidt 31 Oct. 1983 20 p 3 Vol.
(Contract N00014-77-C-0293)
(AD-A142335; TR-16) Avail: NTIS HC A02/MF A01 CSCL 07/4

This paper contains a report of investigations into the application of the transition state theory to atom, ion and molecular group transfers. Attention is concentrated on the formulation of Monte Carlo methods of simulation. It is found possible to derive forms for the rate constant in the diabatic and adiabatic limits which immediately suggest the manner in which Monte Carlo averages should be carried out. The method is illustrated by considering the reactive inversion of a bent A-B-A molecule in a two-dimensional system of disk-like solvent. The activation energy is determined for the transformation to a linear transition state, and a tally is kept of the average adiabaticity of the reaction. These results indicate that the extention of the method to more realistic systems ought to yield valuable information about the mechanisms of reactions in condensed phases. GRA

N84-29984# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
SOLVENT, LIGAND, AND IONIC CHARGE EFFECTS ON REACTION ENTROPIES FOR SIMPLE TRANSITION-METAL REDOX COUPLES
J. T. Hupp and M. J. Weaver Apr. 1984 34 p
(Contract N00014-79-C-0670)
(AD-A142374; TR-33) Avail: NTIS HC A03/MF A01 CSCL 07/4

The dependence of the reaction entropies for simple M(III)/(II) redox couples, with M = Ru, Fe, Os, Cr, upon the nature of the ligands and the solvent is examined with a view towards correlating the entropies with simple physical parameters. For couples containing ammine, ethylenediamine, polypyridine, cyclopentadiene or psuedohalide ligands reaction entropy in a given solvent is found to correlate well with a function of the charge numbers of the oxidized and reduced forms, and with 1/r, where r is the effective radius of the redox couple. This suggests that shortrange ligand-solute interactions do not provide a predominant contribution to reaction entropy for these systems, although this effect is probably important for aquo redox couples in water. The dependence of reaction entropy upon the solvent correlates reasonably well with the solvent acceptor number and other solvent polarity parameters. GRA

N84-29985# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
THE PREDICTION OF ELECTROCHEMICAL REACTIVITIES FROM CONTEMPORARY THEORY: SOME COMPARISONS WITH EXPERIMENT
J. T. Hupp, H. Y. Liu, J. K. Farmer, T. Gennett, and M. J. Weaver Apr. 1984 36 p
(Contract N00014-79-C-0670)
(AD-A142406; TR-31) Avail: NTIS HC A03/MF A01 CSCL 07/4

The application of current theoretical treatments of electron transfer to outer-sphere electrochemical reactions are considered with regard to the numerical prediction of rate parameters from thermodynamic and structural data. Formalisms based on a semiclassical treatment for the Frank-Condon barrier together with an encounter preequilibrium model for the preexponential factor are summarized and related to the more widely considered treatments for homogeneous redox reactions. Comparisons are made between the theoretical predictions and experimental rate parameters for representative inorganic outer-sphere reactions at electrode surfaces, and with related reactions in homogeneous solution. The effects of altering the electrode material and the outer-shell solvent are also considered. Although the measured rate parameters for several reactions at mercury electrodes are in reasonable agreement with the theoretical predictions, significant and even large discrepancies are seen for a number of cases.

Likely reasons for these findings are discussed, including non-adiabaticity and specific solvation effects. Author (GRA)

N84-29986# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
SURFACE-ENHANCED RAMAN SPECTROSCOPY OF ELECTROCHEMICALLY CHARACTERIZED INTERFACES. TRANSITION-METAL ISOTHIOCYANATE ADSORBATES AT SILVER ADSORBATES
M. A. Tadayyoni, S. Farquharson, T. T. T. Li, and M. J. Weaver Apr. 1984 32 p
(Contract N00014-79-C-0670)
(AD-A142407; TR-32) Avail: NTIS HC A03/MF A01 CSCL 07/4

Surface-enhanced Raman (SER) spectra have been obtained at the silver-aqueous interface for nine Cr III, Co III, Ru II, and Rh III ammine or ethylenediamine complexes containing one or more thiocyanates as surface bridging groups. These complexes provide stereochemically well-defined adsorbates having at least one sulfur surface binding site but with electronic properties that differ substantially from thiocyanate itself. The dependence of the SER spectra were examined in each case over a potential range where the complexes are stable with respect to reduction or oxidation, and where the adsorbate coverage remained close to a monolayer. The adsorbate coverage could be evaluated in several cases from the faradaic charge required for one-electron reduction. SER spectra were obtained using a spectrograph-optical multichannel analyzer (OMA) as well as a conventional scanning spectrometer. This enabled the rapid reversible component of the SERS potential dependence to be separated from the irreversible signal decay associated with surface rearrangement. SERS bands due to metal ammine and internal ammine vibrations were observed in addition to those associated with internal thiocyanate and ligand-surface vibrations. GRA

N84-29987# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
SURFACE-ENHANCED RAMAN SCATTERING FOR REDOX-ACTIVE ADSORBATES: PENTAAMMINEOSMIUM (3)/(2) AND PENTAAMMINERUTHENIUM (2) CONTAINING NITROGEN HETEROCYCLE LIGANDS
S. Farquharson, K. L. Guyer, P. A. Lay, and R. H. Magnuson Apr. 1984 32 p
(Contract N00014-79-C-0670)
(AD-A142418; TR-29) Avail: NTIS HC A03/MF A01 CSCL 07/4

Surface-Enhanced Raman Scattering (SERS) for pentaammineosmium (3) and pentaammineruthenium(2) containing pyridine (py), pyrazine (pz), or 4,4'-bipyridine (bpy) ligands adsorbed at the silver-aqueous interface has been examined as a function of electrode potential to explore vibrational changes associated with electron transfer involving simple adsorbates. SERS was observed for the pyridine complexes despite their lack of an unshared electron pair for surface binding, although more intense spectra were obtained for the pyrzine and bipyridine complexes which contain a remote nitrogen lone pair. SER vibrational bands for metal-ligand and internal ammine modes were observed in addition to those due to heterocycle ring modes. Marked shifts were observed in the frequency of several, vibrational bands for adsorbed Os(NH3)5py and Os(NH3)5pz as the electrode potential was made more negative that are consistent with the reduction of Os(3) to Os(2). The potential-dependent concentrations of adsorbed Os(3) and Os(2) as determined using SERS are in good agreement with those obtained from rapid cyclic voltammetry. The bulk-phase Raman spectra exhibit resonance enhancement. GRA

N84-29988# Eagle-Picher Industries, Inc., Miami, Okla.
TRACE ANALYSIS IN QUARTZ Final Technical Report, 1 Jul. 1981 - 31 Dec. 1983
A. L. Fluesmeier Mar. 1984 20 p
(Contract F19628-81-C-0072)
(AD-A142425; RADC-TR-84-51) Avail: NTIS HC A02/MF A01 CSCL 07/4

The objective of this work was to devise a technique capable of determining trace impurities in quartz at the parts per million range. The technique selected was atomic absorption and a procedure was devised for determining lithium, sodium, potassium, iron, aluminum and carbon. Over 150 quartz samples were analyzed using this technique. Author (GRA)

N84-29989# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
THE RELIABILITY OF STANDARD RATE CONSTANTS FOR RAPID ELECTROCHEMICAL REACTIONS
T. Gennett and M. J. Weaver Apr. 1984 26 p
(Contract N00014-79-C-0670)
(AD-A142445; TR-30) Avail: NTIS HC A03/MF A01 CSCL 07/4

A method is outlined for testing the reliability of standard rate constants for rapid electrode reactions evaluated using electrochemical perturbation techniques. This entails monitoring the response of the apparent values of rate constants to systematic alterations of the double-layer structure caused by the addition of specifically adsorbed anions. These rate responses are compared with those observed at the same potential for structurally similar, yet irreversible, reactions for which reliable rate constant potential data can be obtained using conventional d.c. methods. The procedure is applied to rate data obtained for Ru(III)/(II) ammine redox couples by comparing the measured rate increases resulting from the addition of para toluenesulfonate anions with the corresponding rate increases seen for the irreversible reduction of Co(III) ammines. GRA

N84-29990# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
ELECTROCHEMICAL ACTIVATION PARAMETERS FOR SURFACE-ATTACHED REACTANTS EVALUATION OF UNIMOLECULAR FREQUENCY FACTORS FOR REPRESENTATIVE LIGAND-BRIDGED REACTIONS
T. T. T. Li, K. L. Guyer, S. W. Barr, and M. J. Weaver Apr. 1983 22 p
(Contract N00014-79-C-0670)
(AD-A142483; TR-27) Avail: NTIS HC A02/MF A01 CSCL 07/4

The temperature dependence of unimolecular rate constants are reported for the one-electron reduction of various Co(III) and Cr(III) reactants attached to mercury or silver surfaces via either thiocyanate or various thiophenecarboxylate ligands. Combining the ideal activation enthalpies obtained at a constant electrode potential using a nonisothermal cell arrangement with the corresponding activation entropies estimated from reaction entropy data enables values of the unimolecular frequency factor, A sub et, for the elementary electron-transfer step to be evaluated. Values of A sub et close to 10 to the 13th power/sec-01 were obtained in this manner for the thiocyanate-bridged reactions at mercury, indicating that the electronic transmission coefficient approaches unity, i.e., the reactions are adiabatic. GRA

N84-29991# Calspan Advanced Technology Center, Buffalo, N.Y.
CO2 GAMMA 3 FUNDAMENTAL BAND 4.5 MICROMETERS LASER POTENTIAL Final Report, 2 May 1983 - 26 Mar. 1984
J. W. Rich and R. C. Bergman Mar. 1984 38 p
(Contract F33615-83-C-1048)
(AD-A142536; CALSPAN-7176-A-1; AFWAL-TR-84-1033) Avail: NTIS HC A03/MF A01 CSCL 07/4

This report presents results of an experimental program to explore the lasing potential of the CO2 (0,0,V3) = CO2 (0,0,V3-1) a symmetric stretch bands in a cooled electrical glow discharge. The CO2 (0,0,V3) level populations were measured by infrared emission spectroscopy from V3 0= 1 to V3 = approximately 10. The influence of flow velocity, discharge current density, and wall temperature on the populations was measured. It was found that these states do enter a vibration-to-vibration pumped partial population inversion, which is enhanced at lower temperatures. However, states above V3 = approximately 10 do not appear pumped, and the inversion was insufficient to achieve laser oscillation in the apparatus used. Alternate experimental configurations which may achieve lasing on these bands are suggested. Author (GRA)

N84-29992# Cornell Univ., Ithaca, N.Y. Dept. of Chemistry.
THIN FILM SYNTHESIS OF SUPERCONDUCTING CHEMICAL COMPOUNDS Final Report, 1 Jan. 1981 - 30 Dec. 1983
M. J. Sienko, R. Hoffmann, J. A. Newman, and J. M. Burlitch 31 May 1984 15 p
(Grant AF-AFOSR-0009-80)
(AD-A142541; AFOSR-84-0546TR) Avail: NTIS HC A02/MF A01 CSCL 07/4

The objective of this research was to define the chemical factors that affect onset of superconductivity in ternary compounds: to determine how small changes in stoichiometry and microstructure influence critical temperature, how the number and placing of magnetic ions act to quench superconductivity, and how the crystal structure can be modified to enhance superconductivity. The approach was to synthesize, from ultrapure starting elements, ternary borides, silicides, sulfides and selenides of the second and third row transition elements, to characterize the new compounds for X-ray structure, electric and magnetic behavior, and then compare them with doped materials. Four kinds of compounds were investigated: rare earth diosmium disilicides, rare earth osmium-iridium borides, layered structure transition metal dichalcogenides, and Chevrel type molybdenum ternaries. Both the rare earth osmium-iridium borides and rare earth diosmium disilicides were synthesized by arc melting. The crystal structures were refined and magnetic susceptibility studies revealed conventional Hund's rule behavior in the disilicides while the (Pr, Nd) (Os, Ir) 4B4 compounds are characterized by Van Vleck paramagnetism of closely spaced multiplets. Only LaOs2Si2 and LuOs2Si2 compounds are superconducting with Tc's in the 2-4K range. In the layered compounds, lithium intercalated ZrS2, ZrSe2, NbS2, and NbSe2 were studied. GRA

N84-29993# Illinois Univ., Urbana-Champaign. Dept. of Physics.
THEORY OF THE ELECTRONIC STRUCTURE AND OPTICAL PROPERTIES OF ORGANIC SOLIDS: EXCITON EFFECTS Interim Report, 1 Jul. 1983 - 30 Jun. 1984
A. B. Kunz 30 Jun. 1984 18 p Repr. from Quantum Chem. of Polymers: Solid State Aspects p 83-99
(Contract N00014-81-K-0620)
(AD-A142544) Avail: NTIS HC A02/MF A01 CSCL 07/4

The effect of exciton formation in solid hydrocarbons is studied and structural instabilities which accompany such are examined. An abinitio theory of such effects is presented. Briefly considered are two complimentary approaches to the study of organic solids: the method of simulation by finite clusters of molecules, and the methods of energy band theory. In both cases, the initial starting point is the Hartree-Fock method, which, as expected, turns out to be inadequate for any reasonable level of quantitative accuracy. Methods based upon ordinary Rayleigh-Schrodinger Perturbation-Theory are chosen and extensive results for solid CH4 are used as an illustration. GRA

N84-29994# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
INVERSION OF SPECTRAL LINESHAPES TO YIELD COLLISIONAL RATE CONSTANTS Annual Status Report, 1 Sep. 1982 - 31 Sep. 1983
J. Gelfand, H. Rabitz, and R. B. Miles 1 Jun. 1984 15 p
(Contract N00014-78-C-0721)
(AD-A142661; ASR-4) Avail: NTIS HC A02/MF A01 CSCL 07/4

State-of-state collisional energy transfer rates are being obtained by the inversion of pressure broadened linewidth data. Measurements of linewidths in overtone vibration-rotation transitions have yielded information on rotationally elastic and inelastic collision rates for vibrationally excited HCl, HF, and CO. Similar information is being acquired for vibrationally excited DF. Work is continuing in evaluating the energy corrected sudden scaling theory. Author (GRA)

N84-29995# Brookhaven National Lab., Upton, N. Y.
PHOTOVOLTAIC-ELECTROLYZER SYSTEM TRANSIENT SIMULATION RESULTS
R. W. Leigh, P. D. Metz, and K. Michalek Dec. 1983 10 p refs Presented at 6th Ann. ASME Solar Energy Div. Tech. Conf., Las Vegas, Nev., 10 Apr. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010217; BNL-34081; CONF-840402-5) Avail: NTIS HC A02/MF A01

Brookhaven National Laboratory is developing an integrated test bed to illustrate advanced hydrogen technology. The first phase of this effort will investigate the use of solar energy to produce hydrogen from water via photovoltaic-powered electrolysis. A coordinated program of system testing, computer simulation, and economic analysis was adopted to characterize and optimize the photovoltaic-electrolyzer system. The initial transient simulation results are presented. Innovative features of the modeling include the use of real weather data, detailed hourly modeling of the thermal characteristics of the PV array and of system control strategies, and examination of the systems over a wide range of power and voltage ratings. The transient simulation system TRNSYS was used, incorporating existing, modified or new component subroutines as required. For directly coupled systems, the PV array voltage which maximizes hydrogen production is quite near the nominal electrolyzer voltage for a wide range of PV array powers. DOE

N84-29996# California Univ., Livermore. Lawrence Livermore Lab.
DEFINITION OF THE CONCENTRATION GRADIENT ABOVE FLAMMABLE LIQUIDS
Rafael Munoz-Candelario (Puerto Rico Univ., Mayaguez) and Norman J. Alvares 6 Feb. 1984 17 p refs Presented at the ASTM/SFPE Appl. of Fire Sci. to Fire Eng. Symp., Denver, 26-27 Jun. 1984
(Contract W-7405-eng-48)
(DE84-008296; UCRL-89723; CONF-840689-1) Avail: NTIS HC A02/MF A01

Construction and operation-in-area codes concerned with the spill potential of flammable liquids that generate heavy vapor and the separation between these liquids and ignition sources were surveyed. The survey showed that acceptable separation distances between potential spill surfaces and ignition sources increased over the years. A literature search revealed theoretical relationships that include a case for evaporating fluids with boundary conditions of diffusion of the volatile vapor through a stagnant gas film. In enclosed containers with open tops, the calculated vapor concentration gradients are monotonic and directly proportional to the fluid vapor pressure. To assess the validity of these calculated values, experiments were performed to determine the elevations at which flammable mixtures formed above the surfaces of low-volatility, high-vapor-density liquids. The tests involved vaporizing heptane and octane into long, open-ended tubes and then determining the heights at which the lower flammability limits were reached. Results showed that the process does conform to the theoretical relationships found in the literature search. DOE

N84-29997# Sandia Labs., Albuquerque, N. Mex.
EXPERIMENTAL FACILITIES TO STUDY HYDROGEN COMBUSTION AND DETONATION
J. W. Fisk, M. P. Sherman, S. R. Tieszen, and W. B. Benedick 1984 7 p refs Presented at the Design, Construction and Operation of Nucl. Power Plants Conf., Portland, Ore., 5 Aug. 1984
(Contract DE-AC04-76DP-00789)
(DE84-008998; SAND-83-2653C; CONF-840813-10) Avail: NTIS HC A02/MF A01

Two new combustion facilities developed at Sandia National Laboratories in Albuquerque are described. FLAME is a large horizontal channel designed to study problems in hydrogen combustion related to nuclear reactor safety, flame acceleration, transition to detonation, etc. Results from a series of 6 tests with 50% top venting and no obstacles in the channel are presented. The Heated Detonation Tube was developed to study hydrogen-air-steam detonations. Tests with hydrogen-air mixtures at ambient temperatures have achieved detonations down to 13.5% hydrogen. DOE

N84-29998# Oak Ridge National Lab., Tenn.
ENGINEERING SCOPING STUDY OF THE PRODUCTION OF HYDROGEN AND OXYGEN FROM THE CERIUM OXIDE-SODIUM PHOSPHATE/CARBONATE THERMOCHEMICAL CYCLE
H. E. Goeller Apr. 1984 41 p refs
(Contract DE-AC05-84OR-21400)
(DE84-010629; ORNL/TM-7378) Avail: NTIS HC A03/MF A01

One potential industrial application of solar energy is for the production of hydrogen (and oxygen) using a cycle of thermochemical reactions. A preliminary evaluation of the engineering feasibility of such an operation is provided based on the cerium oxide/sodium phosphate/carbonate thermochemical cycle to produce two metric tons of hydrogen per day. Material and heat balances are developed, and equipment is sized. The preliminary pilot plant layout is compared with a plant of the same capacity for producing hydrogen by the electrolysis of water. The use of water electrolysis seems superior and cheaper in all respects. DOE

N84-29999# Department of Energy, Washington, D. C.
INTEGRAL LOW-ENERGY THERMITE IGNITER Patent Application
Albert Gibson, Lowell D. Haws, and Jonathan H. Mohler, inventors (to DOE) Filed 13 May 1983 16 p
(Contract DE-AC04-76DP-00053)
(DE84-011082; US-Patent-Appl-SN-494487) Avail: NTIS HC A02/MF A01

An improvement is disclosed for a thermite igniter/heat source comprising a container holding an internal igniter load. The container consists essentially of consumable consolidated thermite having a low gas output upon combustion, whereby upon ignition, substantially all of the container and the load is consumed with low gas production. DOE

N84-30000# Department of Energy, Washington, D. C.
ULTRAVIOLET LIGHT ABSORBERS HAVING 2 DIFFERENT CHROMOPHORS IN THE SAME MOLECULE Patent Application
Otto Vogl and Shanjun Li, inventors (to DOE) Filed 6 Oct. 1983 15 p
(Contract DE-AI01-76ET-20356)
(DE84-011279; US-Patent-Appl-SN-539366) Avail: NTIS HC A02/MF A01

Ultraviolet light absorbers having two benzotriazole substituted dihydroxybenzophenones and acetophenones chromophors in the same molecule are provided. Both 3.5-[di(2H-benzotriazole-2-yl)]-2,4-dihydroxybenzophenone and 3,5-[di(2H-benzotriazole-2yl)]-2,4-dihydroxyacetophenone which are particularly useful as an ultraviolet light absorbers are provided. DOE

N84-30001# Rockwell International Corp., Golden, Colo. Analytical Lab.
QUALITY ENGINEERING AND CONTROL Annual Progress Report, Jan. - Dec. 1981
Robert L. Carpenter, G. A. Riordan, ed., and I. C. Delaney, comp. 20 Apr. 1984 21 p refs
(Contract DE-AC04-76DP-03533)
(DE84-011603; RFP-3275) Avail: NTIS HC A02/MF A01

Brief summaries are given of research carried out in the following areas: absorption spectroscopy of titanium, niobium, and molybdenum in uranium alloys; atomic absorption spectroscopy of selenium in stainless steel, computer program improvements for spectrophotometer control, and detection of beryllium in stack gases; electrolysis for inactivation of bacteria in cooling-tower water; improved solvent analysis by gas chromatography; sequential radionuclide separation for various sample matrices; progress on an electron microprobe analyzer; and miscellaneous projects. DOE

N84-30002# Sandia Labs., Albuquerque, N. Mex. Fluid Mechanics and Heat Transfer Div.
THIN FLAME MODEL FOR REACTIVE FLOW IN POROUS MATERIALS
M. R. Baer and J. R. Shepher Apr. 1984 54 p
(Contract DE-AC04-76DP-00789)
(DE84-011406; SAND-83-2576) Avail: NTIS HC A04/MF A01

In this report a model for the flow processes associated with a gas generating combustion wave propagating through a porous reactor is described. A one dimensional model is constructed using a thin flame approximation. The flow is determined by the permeability of the unreacted material and the exothermicity of the combustion. Numerical calculations are presented to demonstrate various aspects of the model. In addition, analytical solutions to the flow fields are determined for the limiting cases of reactants with very high or low permeability. DOE

N84-30003# California Univ., Santa Barbara.
PHOTOELECTROCHEMISTRY AT IRON OXIDE ELECTRODES Final Technical Report
John H. Kennedy 1984 5 p refs
(Contracts DE-AT03-76ER-10369; DE-As03-76SF-00034)
(DE84-011453; DOE/ER-10369/T2) Avail: NTIS HC A02/MF A01

The object of the research program was to extend the knowledge of semiconductor photoelectrochemistry for the decomposition of water into hydrogen fuel and oxygen. In particular, a study of iron oxide electrodes in various electrolytes was investigated. DOE

N84-30004# California Univ., Berkeley. Lawrence Berkeley Lab.
VORTEX METHODS AND TURBULENT COMBUSTION
J. A. Sethian Mar. 1984 27 p refs Presented at the AMS-SIAM Summer Seminar on Large-Scale Computations in Fluid Mech., San Diego, Calif., 1 Jun. 1983
(Contract DE-AC03-76SF-00098)
(DE84-011874; LBL-17668; CONF-8306195-1) Avail: NTIS HC A03/MF A01

A series of numerical experiments using random vortex element techniques coupled to a flame propagation algorithm based on Huyghens principle to model turbulent combustion are described. The equations of zero Mach number combustion are solved for the problem of a flame propagating in a swirling flow inside a closed vessel. The competing effects of viscosity, exothermicity, boundary conditions and pressure on the rate of combustion in the vessel are analyzed. DOE

N84-30005# Boston Univ., Mass. Dept. of Chemistry.
INVESTIGATION OF THE STRUCTURE OF PHOTOSYNTHETIC REACTION CENTERS Final Report, 1 Jun. 1981 - 31 May 1984
Hans vanWilligen May 1984 12 p
(Contract DE-AC02-81ER-10911)
(DE84-012475; DOE/ER-10911/6) Avail: NTIS HC A02/MF A01

Dimer formation of tetra(4-sulfonatophenyl)porphyrin and its Zn and Pd complexes was studied using optical and triplet ESR spectroscopy. The data give information on dimer geometry as well as on dimerization effects on photo-excited triplet properties. It is found that dimerization effects mimic those associated with a transition from in vitro bacteriochlorophyll monomers to primary donor bacteriochlorophyll in reaction centers of photosynthetic bacteria. An ENDOR study of the solvation of a porphyrin cation radical established that the ENDOR technique can provide information on weak interactions between paramagnetic macrocycles and surrounding solvent molecules. ENDOR was applied in the study of the photo-excited triplet state of porphyrins and photosynthetic reaction centers randomly oriented in solid solution. Information on the hyperfine interactions between unpaired electrons and nuclear spins obtained with this technique gives an insight into the electronic and geometric structure of these systems. Author

N84-30006# Oak Ridge National Lab., Tenn. Chemical Physics Section.
RESONANCE IONIZATION SPECTROSCOPY OF ARGON, KRYP-

TON AND XENON USING VACUUM ULTRAVIOLET LIGHT
S. D. Kramer Apr. 1984 9 p refs Presented at the 2nd Symp. on Resonance Ionization Spectry. and its Appl., Knoxville, Tenn., 16-20 Apr. 1984
(Contract DE-AC05-84OR-21400)
(DE84-011655; CONF-840449-8) Avail: NTIS HC A02/MF A01

Resonant, single photon excitation of ground state inert gases requires light in the vacuum ultraviolet spectral region. This paper discusses methods for generating this light. Efficient schemes for ionizing argon, krypton, and xenon using resonant, stepwise single photon excitation are presented. DOE

N84-30007# Sandia Labs., Albuquerque, N. Mex.
PULSED-LASER ATOM-PROBE STUDIES OF SURFACE CHEMICAL REACTIONS
G. L. Kellogg 11 Jun. 1984 5 p refs Presented at the 12th DOE Surface Sci./SUBWOG - 7th SUBWOG - 12B Tech. Exchange Meeting, Oak Ridge, Tenn., 11 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-012811; SAND-84-1173C; CONF-840617-1) Avail: NTIS HC A02/MF A01

The pulsed-laser and imaging atom-probe are emerging as powerful tools for the study of surface chemical reactions. Detailed studies of molecular processes such as therml dissociation provide valuable insight into the basic interactions governing a reaction sequence, and extended studies should lead to a complete understanding of simple surface reactions such as CO oxidation, methanation, etc. The combination of these techniques with a high-pressure reactor add a new dimension to the study of surface reactions, and, as the CO oxidation investigation reported here demonstrates, information with direct applicability to commercially important catalytic reactions can be obtained. DOE

N84-30008# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATION OF LASER INDUCED RADICAL REACTIONS USING TIME RESOLVED INFRARED AND COHERENT ANTI-STOKES RAMAN SCATTERING (CARS) SPECTROSCOPY Thesis [UNTERSUCHUNG LASERINDUZIERTER RADIKAIREAKTIONEN MIT HILFE ZEITAUFGELOESTER INFRAROT- UND CARS-SPEKTROSKOPIE]
Thomas Dreier Dec. 1983 136 p refs In GERMAN
(MPIS-17/1983; ISSN-0436-1199) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,70

The CARS and IR fluorescence methods were used on the radical reaction system NH2 + NO in order to study NH2, N2, and H2O. The vibration temperatures of N2 and the excitation degrees of D2 and H2 were determined with a CARS spectrometer in a flow system. The vibrational excitation of homonuclear molecules was done in electrodeless microwave discharges at 3 to 13 mbar. The spectrometer is also suited for the study of CARS spectra of photolytically obtained radicals (OH, NH2), in combination with an exciplex laser. The time and spectrally resolved IR fluorescence of excited particles detection method was also used. The reaction mechanism of the reaction NH2 + NO is discussed. Author (ESA)

N84-30009# Stockholm Univ. (Sweden). Inst. of Physics.
THE BLUE-GREEN SPECTRUM OF GASEOUS Pb2 WAVE NUMBERS AND CONSTANTS OF THE FOu+ - XOg+ SYSTEM
L.-E. Berg, S. Ismail, L. Klynning, H. Martin, A. Pereira, and P. Royen May 1984 20 p refs
(USIP-84-06) Avail: NTIS HC A02/MF A01

The wavenumbers of the band lines obtained by absorption spectroscopy and laser induced fluorescence spectroscopy of the gaseous Pb2 molecule are tabulated. Molecular constants of the F Ou and X Og states are given. Author (ESA)

N84-30010# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
DETECTION OF NH-2O-RADICALS BY FAR-INFRARED LASER MAGNETIC RESONANCE SPECTROSCOPY
P. B. Davies, P. Dransfeld, F. Temps, and H. Gg. Wagner Mar. 1984 27 p refs
(MPIS-6/1984; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,90

The NH2O-radical was detected in the gas phase using far infrared laser magnetic resonance (LMR). Radicals were produced in the reactions of F-atoms with hydroxylamine and of NH2-radicals with ozone. The LMR spectra were observed at 11 different laser frequencies. The assignment of the stronger spectra to the NH2O-radical is based on chemical results and on the observed hyperfine structure. Author (ESA)

N84-30011# National Bureau of Standards, Washington, D.C. National Engineering Lab.
FIRE INDUCED FLOWS THROUGH ROOM OPENINGS - FLOW COEFFICIENTS
K. D. Steckler, H. R. Baum, and J. G. Quintiers Mar. 1984 60 p refs Sponsored in part by Armstrong World Industries, Lancaster, Pa.
(PB84-176759; NBSIR-83-2801) Avail: NTIS HC A04/MF A01 CSCL 21B

A full-scale experimental and theoretical study was made of steady-state fire-induced flows through door-way and window openings. Measurements included two-dimensionl temperature and pressure-difference profiles within the opening and vertical temperature profiles within the rooms connected by the openings. A floor-level gas burner served as the energy source. Mass flow rates through the openings were calculated from the opening data. A static-pressure flow model was used to establish ideal orifice flows from different combinations of the experimental temperature profiles. The opening and ideal flow results were combined to form room-opening flow coefficients as a function of fire energy release rate, opening geometry, and fire location. Two calculation procedures were used to compute the ideal flow. An irrotational jet model for the flow coefficients was developed and found to be in reasonable agreement with these and other measurements. Author (GRA)

N84-30012# Research Triangle Inst., Research Triangle Park, N.C.
EVALUATION OF SAMPLING METHODS FOR GASEOUS ATMOSPHERIC SAMPLES Final Report
E. D. Pellizzari, W. F. Gutknecht, S. Cooper, and D. Hardison May 1984 294 p refs
(Contract EPA-68-02-2991)
(PB84-190735; EPA-600/3-84-062) Avail: NTIS HC A13/MF A01 CSCL 14B

A research program was conducted to test and evaluate several alternatives for collecting and transferring samples from the collection site to the laboratory for the analysis of a variety of toxic organic pollutants by gas chromatography (GC). Sample storage media included three types of polymeric bags (FEP Teflon, Tedlar, five layered aluminized bags), glass bulbs, electropolished and Summa polished cannisters, Tenax GC and charcoal cartridges, and nickel cryogenic traps. Twenty-seven test compounds including hydrocarbons, aromatics, halogeneated hydrocarbons, halogenated aromatics, and oxygen, nitrogen and sulfur-containing compounds were used to test the storage media. Dynamically flowing mixtures of these gases were synthesized using a specially designed permeation/dilution system. Quantitative laboratory stability tests were conducted with Tenax GC, charcoal, and cryogenic traps at 2 concentration levels of 50 parts per billion (ppb) and 200 parts per trillion (ppt), for 15 of the 27 chemicals. Author (GRA)

N84-30680# Joint Publications Research Service, Arlington, Va.
DISSOCIATION OF AMINO ACID-DNA COMPLEXES UNDER INFLUENCE OF LONG-WAVE UV LIGHT Abstract Only
Ye. M. Mil and V. M. Zhiltsova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 67 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Ser. Biol. (Moscow), no. 6, Nov. - Dec. 1983 p 925-928 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

N84-29927*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
HIGH PRESSURE LOX/NATURAL GAS STAGED COMBUSTION TECHNOLOGY
C. R. Bailey *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 261-274 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21B

N84-29952# Olin Corp., Marion, Ill.
COMBUSTION OF GAP, PART 1
Indu B. Mishra, G. P. Juneau, and Ted Groom *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 117-132 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/2

N84-29958# Aerojet Strategic Propulsion Co., Sacramento, Calif.
A NDT IGNITION DELAY PREDICTIVE TOOL
L. A. Howell and S. W. Jang *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 211-218 (For primary document see N84-29939 20-20)
(Contract F42600-81-C-4713)
Avail: NTIS HC A15/MF A01 CSCL 21/2

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N84-30013*# Textron Bell Aerospace Co., Buffalo, N. Y. Electroforming Operations Dept.
STUDY OF HIGH PERFORMANCE ALLOY ELECTROFORMING Monthly Technical Progress Report, 2 Jul. - 27 Jul. 1984
G. A. Malone 6 Aug. 1984 6 p
(Contract NAS8-35817)
(NASA-CR-173828; NAS 1.26:173828; MTPR-7) Avail: NTIS HC A02/MF A01 CSCL 11F

The first series of heat treated nickel manganese alloys are tested for mechanical properties at temperatures of 148.9 C (300 F) and 260 C (500 F). All material receives the same heat treatment in order to provide a common basis for comparison of results. Mechanical property performance improves with increasing manganese content in the alloy. Although all manganese bearing alloy is significantly superior to conventional electroformed nickel, samples containing over 3000 ppm manganese display outstanding ultimate and yield strengths while maintaining reasonably satisfactory ductility. Alloy containing over 6000 ppm of manganese is very competitive to Inconel 718 (mill annealed and age hardened) at all temperatures of interest, although ductility is not as great in the electrodeposited counterpart. M.A.C.

N84-30014*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GRAIN-REFINING HEAT TREATMENTS TO IMPROVE CRYOGENIC TOUGHNESS OF HIGH-STRENGTH STEELS
Homer F. Rush Aug. 1984 50 p refs
(NASA-TM-85816; L-15693; NAS 1.15:85816) Avail: NTIS HC A03/MF A01 CSCL 11F

The development of two high Reynolds number wind tunnels at NASA Langley Research Center which operate at cryogenic temperatures with high dynamic pressures has imposed severe requirements on materials for model construction. Existing commercial high strength steels lack sufficient toughness to permit their safe use at temperatures approaching that of liquid nitrogen (-320 F). Therefore, a program to improve the cryogenic toughness of commercial high strength steels was conducted. Significant improvement in the cryogenic toughness of commercial high strength martensitic and maraging steels was demonstrated through the use of grain refining heat treatments. Charpy impact strength at -320 F was increased by 50 to 180 percent for the various alloys without significant loss in tensile strength. The grain sizes of the 9 percent Ni-Co alloys and 200 grade maraging steels were reduced to 1/10 of the original size or smaller, with the added benefit of improved machinability. This grain refining technique should permit these alloys with ultimate strengths of 220 to 270 ksi to receive consideration for cryogenic service. Author

N84-30015*# SEMTEC, Inc., Huntsville, Ala.
TRANSIENT AND DIFFUSION ANALYSIS OF HgCdTe Annual Report
J. C. Clayton Jul. 1982 141 p refs
(Contract NAS8-33698)
(NASA-CR-162049; NAS 1.26:162049) Avail: NTIS HC A07/MF A01 CSCL 11F

Solute redistribution during directional solidification of HgCdTe is addressed. Both one-dimensional and two-dimensional models for solute redistribution are treated and model results compared to experiment. The central problem studied is the cause of radial inhomogeneities found in directionally solidified HgCdTe. A large scale gravity-driven interface instebility, termed shape instability, is postulated to be the cause of radial inhomogeneities. Recommendations for future work, along with appropriate computer programs, are included. Author

N84-30016# Missouri Univ., Rolla. Dept. of Physics.
KINETIC PROCESSES IN HIGH PRESSURE GASES. EXCITED STATE COLLISIONS Final Technical Report, 1 Jan. 1982 - 31 Mar. 1983
L. D. Schearer Dec. 1983 38 p
(Contract N00014-75-C-0477)
(AD-A141927; TR-14) Avail: NTIS HC A03/MF A01 CSCL 07/4

Spectral line shifts for 3P-nD transitions in sodium induced by collisions with helium, argon, and krypton for $n=5$ to 18 have been measured. The line shifts of the diffuse series transitions increase rapidly with principal quantum number and asymptotically approach the limit predicted by the Fermi model at high quantum numbers. Author (GRA)

N84-30017# Systems Research Labs., Inc., Dayton, Ohio. Research Applications Div.
CHARACTERIZATION OF THE MICROSTRUCTURES OF VARIOUS MATERIALS Final Report, 1 Sep. 1980 - 31 Aug. 1983
A. G. Jackson, R. E. Omlor, C. E. Harper, R. J. Bacon, and R. D. Brodecki Apr. 1984 97 p
(Contract F33615-80-C-5079)
(AD-A141946; AFWAL-TR-84-4052) Avail: NTIS HC A05/MF A01 CSCL 11/6

Research on characterization of microstructures of alloys and non-metallic materials is summarized. The emphasis was on improvements in the appreciation of electron-optical and optical-microscopy methods for determining the morphology, crystallography, and composition of the materials. Alloys studied included those of Al, Ti, and Ni base prepared by ingot, cast, and rapid-solidification methods. Non-metals were polymers and composites of various formulations. Accomplishments included installation of a scanning transmission electron microscope with energy dispersive spectrometry and electron energy loss spectrometers, installation of an ultramicrotome for preparation of nonmetallic specimens, development and improvements of specimen-preparation techniques applied to non-metallics, metal powders, and metallurgical specimens, documentation of microstructures, formulation of analytical methods to provide compositional data, and construction of a simple apparatus for generating experimental quantities or rapidly solidified alloys. Papers and presentations authored or co-authored by personnel are listed. Author (GRA)

N84-30018# Naval Ship Research and Development Center, Bethesda, Md.
SURFACE LAYER EFFECTS ON THE MECHANICAL BEHAVIOR OF METALS
I. R. Kramer May 1984 217 p
(ZR0-0001)
(AD-A142280; DTNSRDC-84/027) Avail: NTIS HC A10/MF A01

CSCL 11/6

The effect of the surface layer on the mechanical behavior of metals is discussed. There is a considerable body of experimental evidence to show that, even in uni-axially deformed specimens, the work hardening is not uniform throughout the cross-section. Rather, the work hardening characteristics of a surface layer that extends approximately 100 micrometers differs considerably from the work hardening characteristics of the interior. The surface layer is shown to have a very large influence on the stress-strain behavior as well as the creep, fatigue and stress-corrosion resistance. The effect of the surface layer on the activation energy and activation volume is discussed. The experimental evidence on polycrystalline metals indicates that in high and low temperature creep, fatigue, stress corrosion and tensile deformation, the dislocation sources near free surfaces operate at lower stresses and more profusely than those in the interior. As measured by X-ray diffraction line profile analysis, the dislocation density in the surface layer, rho sub s, and in the interior, rho sub i increases during fatigue cycling and stress-corrosion exposure. The influence of environment on the mechanical behavior appears to be associated with surface layer. GRA

N84-30019# United Technologies Research Center, East Hartford, Conn.

A STUDY OF THE DEPENDENCE OF MICROSEGREGATION ON CRITICAL SOLIDIFICATION PARAMETERS IN RAPIDLY-QUENCHED STRUCTURES Final Report, Aug. 1979 - Mar. 1984

D. B. Snow Mar. 1984 65 p
(Contract N00014-79-C-0649)
(AD-A142293; UTRC/R84-915797-4) Avail: NTIS HC A04/MF A01 CSCL 11/6

Mechanically-blended powder alloys of Ti-6Al-4V, Ti-6Al-4V blended with less than or = 3Er, Y or Nd, and Ti-6Al-2Sn-4Zr-6Mo-1Er (wt %) were laser-consolidated and rapidly solidified by the LAYERGLAZESM process. This procedure was used to form the fusion zones of butt welds in Ti-6Al-4V plate, premachined with straight-sided 3 mm gaps, which were filled with sequential layers of laser-melted powder feedstock. After melting, the rare-earth elements reacted with dissolved oxygen in the titanium to form a dispersion of equilibrium-structure oxides. The as-solidified microstructure of each alloy consisted of large, columnar rains of acicular alpha HCP martensite. The largest rare earth oxide size and spatial dispersions were observed in alloys LAYERGLAZED from Ti-6Al-4V-3Nd powder; the finest, in those made from Ti-6Al-4V-1.5Er. The largest oxide particles were located at interdendritic and, in the case of Ti-6Al-4V-1.5Er, at intergranular sites. The erbium oxide size distribution was bimodal, with mean sizes of 280 and 40 nm. The oxide structures were identified by analysis of selected area and convergent beam diffraction patterns, obtained from particles determined to contain the appropriate rare earth element by EDS. Neither the ambient temperature tensile strength nor the microhardness of either aged (800 C, 75 min) or as-LAYERGLAZED alloys were significantly improved by the oxide dispersions. GRA

N84-30020# United States Steel Corp., Monroeville, Pa.

THERMOMECHANICAL PROCESSING AND TEXTURE DEVELOPMENT IN Ni-Cr-Mo AND Mn-Mo-B ARMOR STEELS Final Report, 10 Aug. 1982 - 10 Nov. 1983

H. Hu Apr. 1984 90 p
(Contract DAAG46-82-C-0054; DA Proj. 1L1-62601-AH-91)
(AD-A142352; AMMRC-TR-84-14) Avail: NTIS HC A05/MF A01 CSCL 13/8

The purpose and scope of the present research were to produce a strong (112) + (111) texture in the quenched and tempered plates of the Ni-Cr-Mo and Mn-Mo-B conventional armor steels by appropriate thermomechanical processing and to study its effects on the mechanical and ballistic properties of the plates. Also, the effect of carbon content above 0.40 percent on the ballistic properties of textured 5Ni-steel armor was to be investigated. Results indicated that a strong (112) + (111) texture could be produced in plates of both armor steels. Because of the relatively low hardenabilities of these steels, particularly the Ni-Cr-Mo steel, ferrite formation could not be prevented in the on-line quenched plates. The ballistic test results were widely scattered. GRA

N84-30021# Rockwell International Corp., Thousand Oaks, Calif. Science Center.

APPLICATION OF ELECTROCHEMICAL AND MECHANICAL IMPEDANCE MEASUREMENTS TO CORROSION INDUCED FAILURES Final Report, 24 May 1982 - 23 Jan. 1984

F. B. Mansfeld and M. W. Kendig May 1984 39 p
(Contract N62269-82-C-0246)
(AD-A142468; SC5329.8FR) Avail: NTIS HC A03/MF A01 CSCL 11/6

Measurements of the electrochemical impedance for C117 C-Min steel have shown that an additional high frequency time constant occurs during straining in carbonate/bicarbonate only at potentials where stress corrosion cracking (SCC) occurs. This time constant is related to the films which are formed in the potential region where the steel undergoes SCC. Mechanical impedance measurements allow an evaluation of the extent to which applied cyclic stress couples to electrochemical reactions. For C117 steel in phosphate (pH=4) and carbonate/bicarbonate solutions the necessary conditions for SCC have been determined from the potential dependence of the mechanical admittance. The method is therefore useful for screening materials and environments for conditions which are necessary for SCC. Preliminary mechanical impedance measurements have also been carried out during corrosion fatigue of A7075-T73 in 0.5M NaCl at catholic potentials. The ac current flowing from the cracking tip allows us to evaluate the phenomena which occur in the growing crack. Author (GRA)

N84-30022# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.

CADMIUM PLATING VERSUS OTHER COATINGS TO PREVENT CORROSION Final Report

R. A. Farrara Apr. 1984 14 p
(AD-A142504; AD-E440241; ARLCB-MR-84013) Avail: NTIS HC A02/MF A01 CSCL 11/3

The electrodeposited cadmium coating used to prevent corrosion of screws can cause hydrogen embrittlement type failures. Protective coatings applied to screws by processes other than electrodeposition were tested for corrosion resistance (5% salt spray test). The corrosion resistance of cadmium plated screws was significantly superior to the other coatings selected as possible candidates for replacing cadmium. Author (GRA)

N84-30023# Naval Ship Research and Development Center, Bethesda, Md. Ship Materials Engineering Dept.

J-INTEGRAL TEARING INSTABILITY ANALYSIS FOR 8-INCH DIAMETER ASTM A106 STEEL PIPE

M. G. Vassilaros, R. A. Hays, J. P. Gudas, and J. A. Joyce May 1984 98 p
(AD-A142589; DTNSRDC/SME-83-104) Avail: NTIS HC A05/MF A01 CSCL 11/6

An experimental investigation was performed to evaluate the applicability of using J-Integral tearing instability analysis to describe the fracture behavior of 8-inch diameter, nuclear grade, ASTM A106 steel pipe. Pipe sections measuring 48-inches in length and 8.60 inches in diameter with circumferential fatigue precracks were loaded in four point bending using a variable compliance test arrangement. Variations in crack length, moment arm length, and machine stiffness were used to control the ductile fracture behavior of the pipes resulting in either stable or unstable crack extension. J-Integral tests were performed on plan compact specimens machined from the pipe. These J-Integral resistance curves (J sub I curves) were compared to the J sub I-R curves from the pipe bend behavior. In one analysis, the material was modelled by assuming elastic-perfectly plastic behavior, while a second analysis utilized measurements of mechanical response of the loaded structure including hardening of the steel. GRA

N84-30024# California Univ., Berkeley. Dept. of Materials Science and Mineral Engineering.
FATIGUE BEHAVIOR OF LONG AND SHORT CRACKS IN WROUGHT AND POWDER ALUMINUM ALLOYS Annual Report, 15 Apr. 1983 - 14 Apr. 1984
R. O. Ritchie May 1984 205 p
(Grant AF-AFOSR-0181-82)
(AD-A142609; UCB/RP/84/A1021; AFOSR-84-0509TR) Avail: NTIS HC A10/MF A01 CSCL 11/6

The fatigue behavior of short cracks, which are small compared to the scale of the microstructure, small compared to the scale of local plasticity or simply physically small (i.e., approximately 1 mm), must be considered as one of the major factors limiting the application of defect-tolerant fatigue design for airframe and engine components. Accordingly, the current program is aimed at identifying factors which govern the growth of such short cracks (in contrast to long cracks) in a series of commercial aluminum alloys, with specific reference to behavior at near-threshold levels below (approximately 10 to the minus 6th power mm/cycle). In this second annual report, the status of the program is described in terms of: (1) an expanded review of the factors which lead to differences in long and short crack behavior, with particular regard to the role of crack closure mechanisms, (2) a description of experiments performed to characterize the role of microstructure in influencing the propagation of long cracks in I/M 7150 aluminum alloys, and (3) a description of experiments carried out to isolate the effects of crack closure on the propagation of both long and short cracks, and specifically to investigate the location of the closure responsible for the development of a threshold. GRA

N84-30025# Pacific Northwest Lab., Richland, Wash.
SOLVING CORROSION PROBLEMS WITH SURFACE ANALYSIS
D. R. Baer Mar. 1984 26 p refs Presented at 35th Pittsburg Conf. and Exposition on Analytical Chem. and Appl. Spectry., Atlantic City, 5 Mar. 1984
(Contract DE-AC06-65RL-01830)
(DE84-008652; PNL-SA-11624; CONF-840304-3) Avail: NTIS HC A03/MF A01

Surface analysis methods, in combination with traditional tools for corrosion research, have proven useful for the understanding and solution of a wide variety of corrosion problems. This paper reviews the use of several surface analysis methods in applications ranging from industrial problem solving to fundamental research work. A few specific examples are given from the areas of protective film formation, high temperature gaseous corrosion and intergranular stress corrosion cracking. Auger Electron Spectroscopy (AES), X-ray Photoelectron Spectroscopy (XPS), Rutherford Backscattering Spectroscopy (RBS), Nuclear Reaction Analysis (NRA), and Laser Raman Spectroscopy are among the techniques discussed. Several examples of current uses of each method are listed, and advantages and limitations of the various methods for corrosion work are noted. DOE

N84-30026# California Univ., Livermore. Lawrence Livermore Lab.
ANALYSIS OF LOCALIZED MICROSTRUCTURAL CHANGES IN DYNAMICALLY CONSOLIDATED METAL POWDERS
W. H. Gourdin 30 Jan. 1984 9 p refs Presented at 8th Intern. Conf. on High Energy Rate Fabrication, San Antonio, 17 Jun. 1984
(Contract W-7405-eng-48)
(DE84-006298; UCRL-89774; CONF-840653-2) Avail: NTIS HC A02/MF A01

It is demonstrated that conceptually simple and quantitatively useful models are available to describe both the localized deposition of shock wave energy during dynamic consolidation of a metal powder, and the accompanying effects on the final compact microstructure. The type and extent of transformation may be estimated, as well as the shock conditions and powder characteristics necessary for optimum consolidation. If the shock history is known, such models can be used to describe different microstructural regions in the final compact. It is suggested that the marriage of microstructural models to existing hydrodynamic computer programs could provide a means of making realistic predictions of the type, extent and gross distribution of microstructural changes produced when compaction occurs in complex geometries. DOE

N84-30027# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Materials Science and Mineral Engineering.
INFLUENCE OF PROCESSING ON THE CRYOGENIC MECHANICAL PROPERTIES OF HIGH STRENGTH HIGH MANGANESE STAINLESS STEEL
R. Ogawa (Kobe Steel Ltd., Japan) and J. W. Morris, Jr. Aug. 1983 10 p refs Presented at the Cryogenic Eng. Conf. and Intern. Cryogenic Mater. Conf., Colorado Springs, 15 Aug. 1983
(Contract DE-AC03-76SF-00098)
(DE84-008242; LBL-16528; CONF-830841-31) Avail: NTIS HC A02/MF A01

New high strength structural steels have been required for the large superconducting magnets that will be used for the next step test facility for fusion reactor research. The new materials must have high yield strength accompanied with better toughness and better fatigue resistance compared with the conventional nitrogen strengthened stainless steels such as AISI 304LN and 316LN that were used for the cases of the toroidal field coils for the Large Coil Project. A number of new high manganese austenitic steels have been proposed for new cryogenic structural alloys since they can offer low cost, stable austenite and high strength. DOE

N84-30028# Oak Ridge National Lab., Tenn.
SULFUR AND ANTIMONY SEGREGATION TO CREEP CAVITY SURFACES IN NI AND AN FCC Fe-Ni-Cr ALLOY
C. L. White, J. H. Schneibel, and M. H. Yoo Apr. 1984 12 p refs Presented at the 2nd Intern. Conf. on Creep and Fracture of Eng. Mater. and Struct., Swansea, England, 1 Apr. 1984
(Contracts DE-AC05-84OR-21400; W-7405-eng-26)
(DE84-011458; CONF-8404103-2) Avail: NTIS HC A02/MF A01

Segregation of S and Sb to the internal free surfaces of creep induced cavities and microcracks in Ni and an Fe + 15% Ni + 15% Cr alloy was studied using scanning Auger electron spectroscopy (AES). Residual S is found to segregate strongly in the undoped Fe + 15% Ni + 15% Cr while Fe + 15% Ni + 15% Cr + 1% Sb exhibited only Sb segregation. Both S and Sb segregated in Ni + 0.15% Sb. DOE

N84-30029# Oak Ridge National Lab., Tenn.
HIGH-TEMPERATURE ALLOYS: THEORY AND DESIGN
1984 50 p Presented at the High Temp. Alloys - Theory and Design Conf., Bethesda, Md., 8 Apr. 1984
(Contract DE-AC05-84OR-21400)
(DE84-010428; CONF-840417) Avail: NTIS HC A03/MF A01

Abstracts are presented of 35 papers, grouped under the following session headings: thermodynamics and phase diagrams, recent results in alloy design, analysis techniques, electronic structure of disordered alloys, and electronic structure and ordering in alloys. DOE

N84-30030# Pacific Northwest Lab., Richland, Wash.
SPUTTER-DEPOSITED METALLIC AND CERAMIC COATINGS FOR HEAT ENGINES Report, Oct. 1980 - Sep. 1983
J. T. Prater and R. W. Moss Apr. 1984 71 p refs
(Contract DE-AC06-76RL-01830)
(DE84-011401; PNL-5013) Avail: NTIS HC A04/MF A01

Progress in the development of metallic and ceramic coatings with improved high-temperature corrosion and erosion/wear resistance is reported. The objective was to develop coatings that would insure that future heat engines, notably gas turbines and diesels, would be able to operate efficiently on degraded fuel supplies. The majority of coatings investigated were prepared by sputter deposition. Research on sputter-deposited CoCrAlY coatings was directed at improving their low-temperature, hot corrosion resistance by introducing composition gradients and adding platinum. Studies on sputter-deposited ZrO2 and Al2O3 coatings were conducted to improve the thermal cycling resistance of ceramic deposits on metal substrates by using combinations of graded transition layers, columnar ceramic structures, and dense sealing layers. Preliminary results on plasma-sprayed Ni-SiC and quartz-SiC coatings that showed good wear and oxidation resistance are also reported. DOE

N84-30031# Brookhaven National Lab., Upton, N. Y.

POTENTIAL-DETERMINING REACTIONS DURING PITTING CORROSION OF ALUMINUM

H. Isaacs and Y. Ishikawa (Hitachi Ltd., Tsuchiura, Japan) 1984 6 p refs Presented at the 9th Intern. Congr. on Metallic Corrosion, Toronto, Jun. 1984
(Contract DE-AC02-76CH-00016)
(DE84-007695; BNL-34342) Avail: NTIS HC A02/MF A01

Scanning measurements of the potential field over surfaces of aluminum, pitting in dilute chlorine solution, showed that anodic currents observed over pits and the cathodic reactions within the pits do not contribute significantly to the dissolution rates. Nitrate ions added during pitting led to increased potentials by reducing the dissolution rates within the pits, rather than increasing cathodic rates within or external to the pit. Potential decreases after a long period of exposure resulted from increased anodic rates rather than inhibited cathodic sites. DOE

N84-30032# Brookhaven National Lab., Upton, N. Y. Materials Research Group.

INTERGRANULAR FAILURES OF ALLOY 600 IN HIGH TEMPERATURE CAUSTIC ENVIRONMENTS

R. Bandy, R. Roberge (Inst. de Recherche d'Hydro-Quebec), and D. vanRooyen 1984 17 p refs Presented at the NACE Corrosion Intern. Forum and Exhibition, New Orleans, 1 Apr. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010890; BNL-34595; CONF-840405-12) Avail: NTIS HC A02/MF A01

This paper describes the results of our investigation of two commonly observed modes of failure of Alloy 600 in high temperature caustic environments namely, intergranular stress corrosion (IGSCC) and intergranular attack (IGA). Specimens are studied by C-rings under constant deflection, wires with and without any externally applied load, and straining electrodes. The potential dependence of average crack propagation rate is established in a single test by using several C-rings held at different potentials, by using a modification of the static potential gradient method of Seys and Van Haute. The maximum crack propagation rate for C-rings and constant load specimens is very similar but much smaller than that calculated for a straining electrode at the same potential. IGA occurs over a wide range of potential - starting from a few tens of millivolts cathodic to the corrosion potential up to the lower end of anodic potentials normally required for SCC. IGA seems to be rather independent of stress and is generally more pronounced in the crevice area under the nuts used in C-rings. Examination of several creviced coupons shows that outside the crevice, enrichment of iron and chromium occurs on the surface as the potential is raised anodically, whereas the Ni:Fe and Ni:Cr ratios remain relatively independent of potential within the crevice. DOE

N84-30033# Brookhaven National Lab., Upton, N. Y.

MECHANISMS OF INTERGRANULAR FAILURES IN ALLOY 600 IN HIGH TEMPERATURE ENVIRONMENTS

R. Bandy and D. vanRooyen 1984 9 p refs Presented at the 9th Intern. Congr. on Metallic Corrosion, Toronto, 3 Jun. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010514; BNL-NUREG-34270; CONF-840664-6) Avail: NTIS HC A02/MF A01

This paper describes the possible mechanisms underlying intergranular failures of Alloy 600 in three high temperature environments: intergranular stress corrosion cracking (SCC) in caustic (300 to 315C) and in high purity water (315 to 365C); and intergraular attack (IGA) in caustic (300 to 315C); SCC in caustic appears to be governed by a film rupture mechanism and its propagation rate is influenced by electrochemical potential and associated surface film formation. IGA occurs over a relatively wide range of potential, from a few tens of millivolts cathodic to the corrosion potential up to the lower end of anodic potentials normally required for SCC. SCC in high temperature water is strongly temperature dependent, is accelerated by hydrogen and appears to occur at potentials both anodic and cathodic to the corrosion potential. The possible role of the oxide film rupture in SCC in high temperature water is discussed. DOE

N84-30034# Hanford Engineering Development Lab., Richland, Wash.

RING DUCTILITY OF IRRADIATED INCONEL 706 AND NIMONIC PE16

F. H. Huang and R. L. Fish (Rockwell International Corp., Richland, Wash.) 13 Feb. 1984 22 p refs Presented at the 12th Intern. Conf. on Radiation Effects on Mater., Williamsburg, Va., 18-23 Jun. 1984
(Contract DE-AC06-76FF-2170)
(DE84-010397; HEDL-SA-3005-FP; CONF-840604-5) Avail: NTIS HC A02/MF A01

The tensile ductility of fast neutron irradiated, precipitation hardened alloys Inconel 706 and Nimonic PE16 is very low for certain test conditions. A ring compression test provides a method of evaluating the ductility of irradiated cladding specimens. The ductility can be estimated through an analysis of the bending of a ring in terms of strain hardening. Ring sections from irradiated, solution treated Inconel 706 and Nimonic PE16 are compressed in the diametral direction to provide load deflection records over a wide range of irradiation and test temperatures. Ductility in both alloys decreased with increasing test temperatures. The poorest ductility is exhibited at different irradiation temperatures in the two alloys - near 550 C for PE16 and from 460 to 520 C for Inconel 706. The ring ductility data indicate that the grain boundary strength is a major factor in controlling the ductility of the PE16 alloy. DOE

N84-30035# Hanford Engineering Development Lab., Richland, Wash.

TRANSMUTATION OF MANGANESE: SUBSTITUTED STEELS IN STARFIRE

H. L. Heinisch and F. A. Garner 1984 4 p refs
(Contract DE-AC06-76FF-02170)
(DE84-010402; HEDL-7432) Avail: NTIS HC A02/MF A01

Transmutations were calculated for the STARFIRE Tokamak wall employing the manganese substitution alloys currently under investigation in the DAFS program. Irradiation is not expected to greatly change the phase stability of these alloys. DOE

N84-30036# Sandia Labs., Albuquerque, N. Mex.

EXPERIMENTAL RESEARCH FACILITY FOR CREEP-RUPTURE TESTING OF TANTALUM ALLOY T-111

W. A. Kawahara, B. D. Schoeneman, and J. S. Korellis May 1984 23 p refs
(Contract DE-AC04-76DR-00789)
(DE84-012030; SAND-84-8221) Avail: NTIS HC A02/MF A01

A research facility is described for the computer-controlled elevated temperature tensile testing of refractory metallic alloys in an inert environment. In an application to tantalum alloy T-111, it was determined that a two-hour creep rupture life can be achieved at 1204 C (0.45 T/sub m/) and 1300 C (0.48 T/sub m/) if the applied true stresses are maintained below 46 ksi (317 MPa) and 36 ksi (248 MPa), respectively. DOE

N84-30037# Department of Energy, Washington, D. C.

TANTALUM-COPPER ALLOY AND METHOD FOR MAKING Patent Application

Frederick A. Schmidt, John D. Verhoeven, and Edwin D. Gibson, inventors (to DOE) Filed 1 Jun. 1983 11 p
(Contract W-7405-eng-82)
(DE84-011081; US-Patent-Appl-SN-500102) Avail: NTIS HC A02/MF A01

A tantalum-copper alloy can be made by preparing a consumable electrode consisting of an elongated copper billet containing at least two spaced apart tantalum rods extending longitudinally the length of the billet. The electrode is placed in a dc arc furnace and melted under conditions which co-melt the copper and tantalum to form the alloy. DOE

N84-30038# Department of Energy, Washington, D. C.
DUCTILE ALUMINIDE ALLOYS FOR HIGH TEMPERATURE APPLICATIONS Patent Application
Chain T. Liu and Carl C. Koch, inventors (to DOE) Filed 3 Aug. 1983 9 p
(Contract DE-AC05-84OR-21400)
(DE84-011037; US-Patent-Appl-SN-519941) Avail: NTIS HC A02/MF A01

Heat- and corrosion-resistant alloys are described which contain nickel, aluminum, boron, iron and in some instances manganese, niobium and titanium. DOE

N84-30039# Department of Energy, Washington, D. C.
IMPROVED OXIDATION SULFIDATION RESISTANCE OF Fe-Cr-Ni ALLOYS Patent Application
Ken Natesan and David J. Baxter, inventors (to DOE) Filed 26 Jul. 1983 16 p
(Contract W-31-109-eng-38)
(DE84-010066; US-Patent-Appl-SN-517474) Avail: NTIS HC A02/MF A01

High temperature resistance of Fe-Cr-Ni alloy compositions to oxidative and/or sulfidative conditions is provided by the incorporation of about 1 to 8 wt % of Zr or Nb and results in a two-phase composition having an alloy matrix as the first phase and a fine grained intermetallic composition as the second phase. The presence and location of the intermetallic composition between grains of the matrix provides mechanical strength, enhanced surface scale adhesion, and resistance to corrosive attack between grains of the alloy matrix at temperatures of 500 to 1000 C. DOE

N84-30040# Department of Energy, Washington, D. C.
HARD METAL COMPOSITION Patent Application
Haskell Sheinberg, inventor (to DOE) Filed 26 Jul. 1983 10 p
(Contract W-7405-eng-36)
(DE84-011034; US-Patent-Appl-SN-517536) Avail: NTIS HC A02/MF A01

A composition of matter having a Rockwell A hardness of at least 85 is formed from a precursor mixture comprising between 3 and 10 wt % boron carbide and the remainder a metal mixture comprising from 70 to 90% tungsten or molybdenum, with the remainder of the metal fixture comprising nickel and iron or a mixture thereof. The composition has a relatively low density of between 7 and 14 g/cc. The precursor is preferably hot pressed to yield a composition having greater than 100% of theoretical density. DOE

N84-30041# Department of Energy, Washington, D. C.
SYNTHESIS OF REFRACTORY MATERIALS Patent Application
Joseph B. Holt, inventor (to DOE) Filed 16 Aug. 1983 15 p
(Contract W-7405-eng-48)
(DE84-011045; US-Patent-Appl-SN-523556) Avail: NTIS HC A02/MF A01

Refractory metal nitrides are synthesized during a self-propagating combustion process utilizing a solid source of nitrogen. For this purpose, a metal azide is employed, preferably NaN3. The azide is combusted with Mg or Ca, and a metal oxide is selected from Groups III-A, IV-A, III-B, IV-B, or a rare earth metal oxide. The mixture of azide, Ca or Mg and metal oxide is heated to the mixture's ignition temperature. At that temperature the mixture is ignited and undergoes self-sustaining combustion until the starter materials are exhausted, producing the metal nitride. DOE

N84-30042# Ames Lab., Iowa.
DIRECTIONAL GROWTH OF PEARLITE IN Fe-C EUTECTIOD ALLOYS M.S. Thesis
Gary Robert Haupt Jun. 1983 45 p refs
(Contract W-7405-eng-82)
(DE84-007368; IS-T-1069) Avail: NTIS HC A03/MF A01

The maximum temperature gradient which can be established in a 1/4 inch diameter eutectiod steel rod while maintaining a flat pearlite growth front perpendicular to the axis of the rod and not melting the surface of the sample has been determined to be approximately 2200 degrees C/cm. The experimental setup for these experiments provided such as efficient means of heating a sample that only a small fraction of the available power was required. The conditions for pearlite nucleation in a temperature gradient can be predicted from CCT data for gradients of 500, 1000, and 2000 degrees C/cm. At a gradient of 175 degrees C/cm, the conditions for nucleation can not be predicted from CCT data. The fact that ferrite nucleated ahead of the growth front, even at the slowest growth rate used, indicated that the system becomes more sensitive to composition and the nucleation of proeutectiod ferrite is more favorable than the nucleation of pearlite as predicted by CCT data. Although the results of the interlamellar spacing measurements were inconclusive, there does appear to be a stress effect. The trend in the average spacings is towards increased spacing with increased tensile stress. DOE

N84-30043# Argonne National Lab., Ill. Materials Science and Technology Div.
OXIDATION-SULFIDATION BEHAVIOR OF Fe-Cr-Ni ALLOYS CONTAINING ADDITIONS OF Zr, Nb, OR Ti
D. J. Baxter and K. Natesan Dec. 1983 8 p refs Presented at 9th Intern. Congr. on Metallic Corrosion, Toronto, 3 Jun. 1984
(DE84-005411; CONF-840664-1) Avail: NTIS HC A02/MF A01

Rapid degradation of Fe-Cr-Ni alloys may occur in mixed oxygen- and sulfur-containing environments at elevated temperatures unless a protective surface oxide scale can be formed and maintained. The present results indicate that alloy chemistry has a strong influence on the scaling behavior of a Fe-25% Cr-20% Ni-base alloy. The presence of Mn (which forms a stable sulfide at low sulfur potentials) or Ti (which permits high rates of oxide growth) may contribute to breakaway behavior, whereas the addition of either of two reactive elements, Zr or Nb, promotes protection by an oxide scale. Mechanisms to explain the effects of individual elemental additions to the base alloy are discussed. DOE

N84-30044# Department of Energy, Washington, D. C.
METHOD OF ENHANCING SELECTIVE ISOTOPE DESORPTION FROM METALS Patent Application
Randall J. Knize and Joseph L. Cecchi, inventors (to DOE) Filed 26 Jul. 1983 10 p
(Contract DE-AC02-76CR-03073)
(DE84-011031; US-Patent-Appl-SN-517477) Avail: NTIS HC A02/MF A01

A method of enhancing the thermal desorption of a first isotope of a diatomic gas from a metal involves: (1) establishing a partial pressure of a second isotope of the diatomic gas in vicinity of the metal; (2) heating the metal to a temperature such that the first isotope is desorbed from the metal; and (3) reducing the partial pressure of the desorbed first isotope while maintaining the partial pressure of the second isotope substantially constant. The method is especially useful for enhancing the desorption of tritium from the Zr-Al getter in a plasma confinement device, but may be used to enhance desorption of any diatomic gas from any metal. DOE

N84-30045# California Univ., Livermore. Lawrence Livermore Lab.
CORROSION OF 5083 ALUMINUM BY AQUEOUS SODIUM SULFATE
C. Chen and J. J. Truhan Nov. 1983 14 p refs
(Contract W-7405-eng-48)
(DE84-012033; UCRL-53504) Avail: NTIS HC A02/MF A01

Electrochemical techniques were used to determine the corrosion rate of 5083 aluminum in sodium sulfate solution, and correlated the results with findings from standard metallographic examination. The corrosion rate measured by linear polarization was low: less than 1 mil/y for temperatures ranging from 23 to 70(0)C and deaerated concentrations from 1 to 30 g/l. The corrosion current varied over these ranges by about one order of magnitude. Increasing concentrations and temperatures produced increasing current, as expected; temperature had a stronger effect than concentration on the corrosion rate, however. Potentiodynamic polarization curves obtained at the above ranges of temperature and concentration showed the quasi-active-passive behavior typical of aluminum alloys in salt solutions. The curves were qualitatively similar for all of the experimental conditions. As the concentration and temperature increased, the rest potential became more active, and the average passive current similarly increased. As in the linear-polarization measurements, the current varied by about one order of magnitude over all conditions. In order to identify the mode of attack, we used a scanning electron microscope to examine samples anodically polarized for 1 h at 70(0)C and 30 g/l. The attack was uniform, and there was no evidence to suggest localized attack. DOE

N84-30046# Sandia Labs., Albuquerque, N. Mex.
CREEP-FATIQUE AND TEMPERATURE SYNERGISMS IN ALLOY 800
Wendell B. Jones 1984 17 p refs Presented at the 113th Ann. Meeting of the Am. Inst. of Mining, Met. and Petrol. Engr., Los Angeles, 26 Feb. 1984
(DE84-010131; SAND-83-1690C; CONF-840218-7) Avail: NTIS HC A02/MF A01

Alloy 800 from three different commercial heats was continuously cycled with a hold period at 922(0)K. The starting microstructures of these heats reflect an inherently wide spectrum of possibilities for Alloy 800. The amounts and morphologies of the TiC and M23C6 carbiaes are different among the heats. During cycling, M23C6 forms intragranularly in a solution annealed heat. This precipitation contributes to the cyclic hardening. Both mill annealed heats of Alloy 800 are stable to carbide precipitation during cycling. The heat with the lower carbon content formed (GAMMA) during cycling but the volume fraction was too low to contribute to hardening. The inclusion of hold periods caused the dislocation substructure to become more diffuse in the mill annealed heats. The cyclic hardening was enhanced with the inclusion of the hold periods but this was not due to any microstructural change during testing. DOE

N84-30047# California Univ., Berkeley. Lawrence Berkeley Lab.
GALVANIC CORROSION OF AN ALUMINUM O-RING
J. J. Truhan and C. Chen 30 Mar. 1984 13 p refs
(Contract W-7405-eng-48)
(DE84-011345; UCID-20002) Avail: NTIS HC A02/MF A01

The purpose was to estimate the extent of galvanic corrosion occurring between the components of a metal O-ring. The O-ring consists of a split toroid composed of 1050 Al and the internal component, which is a 750x Inconel spring that provides the elasticity. The galvanic measurements were made in deionized water to simulate humid conditions and in a 1% NaCl aqueous solution to simulate the acceleration in corrosion that may occur if surface contamination due to handling or inadequate cleaning is present on the surface. DOE

N84-30048# Illinois Univ., Urbana. Dept. of Metallurgy and Mining Engineering.
FORMATION OF DISPERSIONS OF RARE EARTH OXIDES IN TITANIUM ALLOYS USING RAPID SOLIDIFICATION PROCESSING Ph.D. Thesis
Douglas Gerard Konitzer Mar. 1984 200 p refs
(Contract DE-AC02-76ER-01198)
(DE84-008664; DOE/ER-01198/1407) Avail: NTIS HC A09/MF A01

Rapid solidification processing (RSP) was used to produce extended solid solutions of rare earth elements and O in Ti and some of its alloys. RSP was effected by laser surface melting and the resulting microstructures characterized using analytical TEM. Heat treatment, typically 10 h at 1000(0)K, results in the formation of an ultrafine dispersion of rare earth oxides. In the case of Er2O3, the particles are 8 to 20 nm in diameter with a mean interparticle spacing of 120 nm. The point and space groups of these precipitates are consistent with these being m3 and Ia3, respectively, which are identical with those of the rare earth oxides Y2O3, Er2O3. The orientation relationships (OR) exhibited by these oxide particles were studied. The coarsening equations, modified for Er2O3 particles in a Ti matrix, were used to predict the coarsening behavior of the dispersions produced. If the composition of the alloy contains an excess amount of Er, the particles exhibit remarkable stability up to the (BETA)-transus. Above this temperature, the coarsening rate increases markedly. For a slight excess of O, the stability of the particles is extremely improved up to above 1200(0)K. In a specimen tested to failure, there was a marked increase in mechanical strength. DOE

N84-30049# Argonne National Lab., Ill.
APPLICATION OF TRANSVERSE-SECTION ANALYTICAL ELECTRON MICROSCOPY TO THE STUDY OF OXIDATION OF METAL ALLOYS
Wayne E. King, N. L. Peterson, and J. F. Reddy 1984 9 p refs Presented at the 9th Intern. Congr. on Metallic Corrosion, Toronto, 3-7 Jun. 1984
(Contract W-31-109-eng-38)
(DE84-006415; CONF-840664-2) Avail: NTIS HC A02/MF A01

The transverse section analytical electron microscopy technique to study the so-called reactive-element effect in Fe-Cr-Y alloys is discussed. In all alloys that were investigated, Y was precipitated as Y2(Fe,Cr)17. Precipitates that were close to the oxidizing interface were observed to oxidize internally. Internal oxidation of a single Y2(Fe,Cr)17 precipitate leads to formation of a colony of much smaller Y2O3 particles. These particles are not incorporated into the scale during oxidation. The Y additions were found to strongly affect the microstructural evolution of the growing oxide scale. DOE

N84-30050# Ohio State Univ., Columbus. Dept. of Metallurgical Engineering.
THE INFLUENCE OF NITROGEN ON THE SENSITIZATION, CORROSION, MECHANICAL AND MICROSTRUCTURAL PROPERTIES OF STAINLESS STEELS Annual Report
William A. T. Clark and Digby D. MacDonald Apr. 1983 72 p refs
(Contract DE-AC02-81ER-10972)
(DE83-017203; DOE/ER-10972/T2; AR-2) Avail: NTIS HC A04/MF A01

In order to elucidate the mechanistic role of nitrogen on the SCC of austenitic stainless steels in high temperature water, slow-strain-rate tests were conducted in 0.01M Na2SO4 and 0.01M NaCl aqueous solutions at 250 C. Results from these tests as well as those from metallographic observations of the microstructure by TEM and SEM are discussed. DOE

N84-30051# Lehigh Univ., Bethlehem, Pa. Dept. of Metallurgy and Materials Engineering.
ANALYSIS OF FRACTURE MODES DURING EXTRUSION AND DRAWING OF BIMETAL RODS OR WIRE Final Report
B. Avitzur, R. Wu, Y. T. Chou, and S. Talbert 9 Jan. 1984 165 p refs
(Contract DE-AC02-79ER-10367)
(DE84-009849; DOE/ER-10367/14) Avail: NTIS HC A08/MF A01

Based on the upper bound theorem in limit analysis, a theoretical model describing sound flow, core fracture, and sleeve fracture in bimetal rods and wire during extrusion and drawing was developed. The variables affecting core and sleeve fracture are: reduction in area, die geometry, friction, relative size and strength of the core, and applied surface tractions. Within the wide range of combinations of these process variables, only a small range permits coextrusion and codrawing without fracture. Criteria for the prevention of core and sleeve fracture during coextrusion and core fracture during codrawing were developed and presented graphically in this study. The results were applied to the central burst problem during extrusion and drawing of homogeneous materials. DOE

N84-30052# Oak Ridge National Lab., Tenn. Solid State Div.
ION IMPLANTATION, ION BEAM MIXING AND ANNEALING STUDIES OF METALS IN Al2O3, SiC AND Si3N4
B. R. Appleton, H. Naramoto, C. W. White, O. W. Holland, C. J. McHargue, G. Farlow, J. Narayan, and J. M. Williams 1984 11 p refs Presented at the 2nd Intern. Conf. on Radiation Effects in Insulators, Albuquerque, N. Mex., 30 May 1983
(Contract DE-AC05-84OR-21400)
(DE84-012336; CONF-830573-11) Avail: NTIS HC A02/MF A01

Ion scattering/channeling, transmission electron microscopy, electron paramagnetic resonance and optical microscopy are utilized to determine the structural modifications of ion implanted and annealed Al2O3, SiC, and Si3N4, and to correlate these modifications to surface mechanical property measurements. Ion beam mixing is also studied for inducing increased adherence of metal films on these insulators. DOE

N84-30053# Tokyo Univ. (Japan). Dept. of Materials Science.
EVOLUTION OF CAVITY MICROSTRUCTURE IN ION-IRRADIATED 316 SS AND Fe-20Ni-15Cr ALLOY
A. Kohyama, B. Loomis (Argonne National Lab., Ill.), G. Ayrault (Argonne National Lab., Ill.), and N. Igata Apr. 1984 30 p refs Presented at the 12th Intern. Symp. on Effects of Radiation on Mater., Williamsburg, Va., 18-20 Jun. 1984
(Contract W-31-109-eng-38)
(DE84-012111; CONF-840604-6) Avail: NTIS HC A03/MF A01

The effect of helium implantation schedule on the evolution of the cavity microstructure in 316 SS and Fe-20Ni-15Cr alloy during heavy-ion irradiation was investigated for damage levels up to 100 dpa with three helium injection schedules, i.e., 15 appm He/dpa, 50 appm He/dpa and 15 appm He preinjected prior to Ni(+) ion irradiation. In the case of the dual-ion irradiated specimens, there was a trend towards a saturation of the swelling with increasing damage level that was closely related to the saturation and subsequent decrease of the number density of the small cavities (< 8 nm diameter for 316 SS and< 4 nm for Fe-20Ni-15Cr) and the dislocation density. The bi-model cavity size distribution that was determined for the Fe-20Ni-15Cr alloy at 40 dpa changed to uni-modal distribution at 65 and 100 dpa. Radiation-induced segregation was high and this was related to the saturation tendency for the swelling. DOE

N84-30054# Ames Lab., Iowa.
DUCTILE-BRITTLE TRANSITION TEMPERATURE MEASUREMENT OF TEMPER EMBRITTLED Ni-Cr STEELS BY MEANS OF SMALL PUNCH TESTS
Jai-Man Baik, J. Kameda, and O. Buck 1983 31 p refs Presented at the Symp. on the Use of Nonstandard Subsized Specimens for Irradiated Testing, Albuquerque, N. Mex., 23 Sep. 1983
(Contract W-7405-eng-82)
(DE84-012833; IS-M-474; CONF-8309170-7) Avail: NTIS HC A03/MF A01

The ductile-brittle transition temperatures of Ni-Cr steels having various degrees of intergranular embrittlement and various microstructures were determined by means of small punch tests. The measured values were compared with those obtained from Charpy impact and uniaxial tensile tests. The effects of punch tip shape, notch, and strain rate on the ductile-brittle transition behaviors were examined. It was found that the combined use of a notch, high strain rates and a small punch tip strongly affects the ductile-brittle transition behavior. Considerable variations of the data were observed when the small punch tests were performed on coarse-grained steels. Several factors controlling embrittlement measurements of steels are discussed in terms of brittle fracture mechanisms. DOE

N84-30055# Sandia Labs., Albuquerque, N. Mex.
LIQUID METAL INFILTRATION OF AN ALUMINUM ALLOY INTO A PACKED COLUMN OF B4C PARTICLES
F. M. Hosking and A. A. Netz May 1984 28 p refs
(Contract DE-AC04-76DP-00789)
(DE84-012136; SAND-83-2573) Avail: NTIS HC A03/MF A01

The infiltration length of an Almag 35 alloy (6 to 7% Mg, balance Al) into a packed bed of B4C particles was investigated. The influence of particle size (3.0 to 9.0 mm), particle preheat (477 to 700(0) K), and metal pour temperature (1033 to 1144(0)K) on metal infiltration was evaluated. Particle size and the interaction effects between particle size/particle preheat, particle size/pour temperature and particle preheat/pour temperature had a significant influence on metal penetration. A first approximation model for infiltration was developed. Maximum penetrations of approximately 119 mm were observed for a 9 mm/700 K preheat/1144 K pour parameter of the factor space. DOE

N84-30056# California Inst. of Tech., Pasadena.
MECHANICAL PROPERTIES OF A SHOCK CONSOLIDATED STEEL POWDER
Prakash Kasiraj, Thad Vreeland, Jr., Ricardo B. Schwarz (Argonne National Lab.), and Thomas J. Ahrens Sep. 1983 5 p refs Presented at the 3rd APS Conf. on Shock Waves in Solids, Santa Fe, N. Mex., 18 Jul. 1983 Submitted for publication
(Contract W-31-109-eng-38)
(DE84-003573; CONF-830719-60) Avail: NTIS HC A02/MF A01

The microhardness, ultimate tensile strength, and elastic modulus of 44 to 74 (MU)m AISI 9310 rapidly solidified powder, consolidated by shock waves with energies varying from 94 to 770 kj/kg and a shock duration of 2 to 3 (MU)s, are presented. The compacts produced have a variation in diamond pyramid hardness from 390 to 510, in strength from 0 to 1.4 GPa, and in elastic modulus from 66 to 181 GPa. The hardness and strength reach a maximum at 500 kJ/kg shock energy. The strength and elastic modulus results imply that 800 kJ/kg shock energy produces complete interparticle bonding. DOE

N84-30057# Oak Ridge Gaseous Diffusion Plant, Tenn.
ASPECTS OF ELECTROLESS NICKEL PLATING ON MOLYBDENUM
R. D. Mikkola, C. E. Daugherty, G. E. Harris, W. A. Neff, and W. W. Owens Jul. 1984 15 p Presented at the Am. Electroplaters Soc. SUR/FIN Conf., New York, N.Y., 1 Jul. 1984
(Contract W-7405-eng-26)
(DE84-006434; K/PS-5033; CONF-840711-2) Avail: NTIS HC A02/MF A01

A process for depositing an adherent coating of an electroless nickel phosphorus alloy on molybdenum was developed. The required pretreatment processes included an anodic etch in a chromic acid nitric acid solution, an anodic etch in a phosphoric acid solution, and an oxide stripping step in a chromic acid nitric acid solution. Initiation of the electroless nickel plating was accomplished through a series of strikes in the nickel bath. Scale up from laboratory parts to large components involved optimization of parameters such as pretreat time, current density, anode to cathode ratio and strike time. DOE

N84-30058# Pacific Northwest Lab., Richland, Wash.
ENVIRONMENTAL ASSISTED FRACTURE OF CAST AND WROUGHT STEELS IN BRINE
S. G. Pitman and E. E. Hall Mar. 1984 5 p Presented at the Waste Management Conf., Tucson, Ariz., 11-15 Mar. 1984
(Contract DE-AC06-76RL-01830)
(DE84-011870; PNL-SA-12116; CONF-840307-42) Avail: NTIS HC A02/MF A01

Two test methods, slow strain rate (SSR) tests and corrosion fatigue tests, are being used to investigate the susceptibility of wrought and cast mild steels to environmentally assisted fracture. The SSR test provides an assessment of relative cracking susceptibility, and is most useful for comparing the effects of different environments on a given material, and for measuring the relative susceptibility of different materials to environmentally assisted cracking in a given environment. The corrosion fatigue test measures the stress intensity (which is porportional to stress times the square root of crack length) below which an existing flaw or crack will not grow. The test may also prove useful in measuring the stress intensity that provides an acceptable rate of crack growth. The SSR test has been used to investigate the effects of strain rate, temperature, and solution oxygen content on fracture properties of mild steel. The results of currently available corrosion fatigue tests are limited to crack growth rate measurements at one frequency in air and in brine. These measurements will be part of an overall program to evaluate allowable stress intensities, but this evaluation cannot be made until measurements are taken at different frequencies and at lower stress intensities. DOE

N84-30059# California Univ., Davis. Div. of Materials Science and Engineering.
THE ROLE OF SINTERING IN THE OXIDATION-REDUCTION OF PALLADIUM POWDERS
Z. A. Munir and P. G. Coombs 1983 15 p refs Presented at the Intl. Symp. on Grain Boundaries and Interfaces in Ceramics, May 1983
(Contract DE-AT03-80ER-10708)
(DE84-011202; DOE/ER-10708/T2) Avail: NTIS HC A02/MF A01

An investigation of the influence of grain boundary formation through sintering on the successive oxidation-reduction of palladium powders was conducted over the temperature range 575 to 650(0)C. Loose powders were heated in air and their rate of oxidation was monitored continuously up to 100 hours. Subsequent reduction and oxidation cycles resulted in successively lower levels of oxidation. DOE

N84-30060# Kema (N. V.), Arnhem (Netherlands). Dept. of Chemical Research.
CORROSION OF UNALLOYED STEELS IN DIFFERENT ALKALINE SOLUTIONS AT HIGH TEMPERATURES AND UNDER HIGH PRESSURES
W. M. M. Huijbregts 1983 11 p refs
(S/T-Rept-Vol-1-No-1; B8464514; ISBN-90-353-0005-X; ISSN-0167-8590) Avail: NTIS HC A02/MF A01

The alkaline corrosivities of the nonvolatile chemicals NaOH, KOH, LiOH and Na3PO4-Na2HPO4 used as acid-chloride corrosion inhibitors in evaporators, at high temperatures and under high pressures were determined by autoclave studies. There is a critical hydroxide concentration for NaOH, KOH and LiOH above which the corrosion rates increase dramatically; LiOH has the lowest critical concentration (0.5 mol). The corrosion rate in high concentrations of LiOH is five times faster than in NaOH. Many heats were performed on a number of steel classes in highly concentrated hydroxide solutions. There is a wide variation in the corrosion rates. Author (ESA)

N84-30061# Stockholm Univ. (Sweden). Inst. of Physics.
RF SPUTTERING AND ANNEALING OF AMORPHOUS ZINC TELLURIDE FILMS
P. G. Larsson Apr. 1984 21 p refs
(USIP-84-04) Avail: NTIS HC A02/MF A01

Zinc telluride films were grown on glass substrates by RF-sputtering. The deposition rate varies with the square of applied target bias voltage. Rates approaching 40 nm/min are achieved at 1 Pa argon gas pressure with 1500 V applied to the target. The deposition rate varies with the gas pressure, with maximum at 1 Pa. A graph of dc conductivity versus reciprocal temperature indicates the presence of several conduction mechanisms. Annealing a zinc telluride film increases the conductivity at the Fermi level. Further annealing of the film initiates a phase transformation, which takes place with activation energy 2.8 eV. The structure transformation is a volume crystallization process. Author (ESA)

N84-30062# Missouri Univ., Rolla.
ELECTROCHEMISTRY RESEARCH NEEDS FOR MINERAL AND PRIMARY MATERIALS PROCESSING: REPORT OF WORKSHOP
T. J. OKeefe and J. W. Evans (California Univ., Berkeley) Dec. 1983 219 p refs Workshop held in Rolla, Mo., 5-7 Jun. 1983
(Contract DI-BM-J0-134014; Grant NSF CPE-83-01523)
(PB84-192905; NSF/CPE-83011) Avail: NTIS HC A10/MF A01 CSCL 11F

Papers delivered at the workshop are organized into four sections: related electrochemical technology, fundamentals of electrometallurgy, fused salt electrometallurgy, and aqueous electrometallurgy. Among the topics discussed are: electroplating, leaching, current distribution phenomena and modeling of electrochemical cells, anodic reactions in aqueous electrowinning, titanium electrowinning, electrocrystallization of metals research needs, and electrochemical phenomena in aqueous winning and refining. Among the topics identified for further research are lower cost refining methods, anode gas behavior, inexpensive wettable cathode materials, and non-consumable anodes. A list of attendees is included. GRA

N84-30063# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AERONAUTICAL MATERIALS (SELECTED ARTICLES)
13 Mar. 1984 179 p refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 p 1-22, 31-74, and 15 unnumbered pages
(AD-A139952; FTD-ID(RS)T-1868-83) Avail: NTIS HC A09/MF A01 CSCL 11/6

Directionally solidified techniques, tempering transformation; effects of solid solution temperature and cooling rates on microstructure; influence of temperature on aluminum alloys; and fatigue crack propagation are presented. For individual titles, see N84-30064 through N84-30071.

N84-30064# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INFLUENCES OF DIRECTIONALLY SOLIDIFIED TECHNIQUES AND HAFNIUM CONTENT ON A NICKEL BASE HIGH TEMPERATURE ALLOY
Wang Luobao, Chen Rongzhang, and Wang Yuping *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 1-18 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/6

Two directionally solidified techniques, the power decrease (P.D.) and high rate solidification (H.R.S.) methods, are used to study the influences of the different Hf contents on the structures and properties of a nickel base high temperature alloy. When entering the alloy the Hf is mainly segregated in the interdentritic regions and gamma/gamma prime eutectic phases. After the alloy is added, there are noticeable changes in the microstructure. The amount of gamma/gamma prime eutectic phase noticeably increases. Its morphology also undergoes noticeable changes. The conditions of grain boundaries and interdentritic regions are improved. Several new types of Hf-rich microfacies also appeared. At 760 C, the endurance properties (especially the transverse properties) of the alloy noticeably rise with the increase of the Hf content. However, at 1040 C, the endurance life decreases with the increase of the Hf content. When the H.R.S. technique is used, the medium and high temperature performances of the alloy are both noticeably superior to the P.D. technique. Author

N84-30065# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A STUDY OF THE TEMPERING TRANSFORMATION OF RETAINED AUSTENITE IN ISOTHERMAL QUENCHING STRUCTURES, BAINITE TEMPERED EMBRITTLEMENT
Wang Ping, Yang Zheng, and Kang Mokuang *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 19-41 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/6

The Ar tempering dynamics after 30CrMnSiNi2A steel isothermal quenching are determined, dynamic and static observations of tempering structures were carried out and the stability of Ar and tempered embrittlement in this steel were studied. The results show that: the upper branch of the -C curve of Ar after isothermal quenching corresponds to the upper (or inverse) bainite transformation and the lower branch corresponds to the lower bainite or isothermal martensite transformation; the heat treating technique can control the stability of Ar; the major factors causing tempering embrittlement (especially in structures containing large amounts of Ar) are - Ar decomposition into upper (or inverse) bainite and the cementite film and temper-cooling and deformation transforming into martensite. After isothermal quenching, the workpiece should be tempered between 250 to 300 C. Author

N84-30066# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE EFFECTS OF SOLID SOLUTION TEMPERATURES AND COOLING RATES ON THE MICROSTRUCTURES OF BT3-1 TITANIUM ALLOY

Zhang Shaoging and Huang Heng *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 42-62 Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/6

X-rays, optical metallography and transmission electron microscopy was used to study the effects of various heating temperatures and cooling rates (water quenching, air cooling and furnace cooling) on the microstructures of BT3-1 titanium alloy. The alpha double prime martensite was formed by water quenching from beta field temperatures; the alpha double prime and alpha phases were obtained by water quenching from upper temperatures of the (alpha + beta) phase field; the alpha and beta phases were obtained by 850 C water quenching. The lattice constant changes of the alpha double prime martensite as well as substructure and hardness changes were investigated. The various morphologies of the alpha and beta phases from various solid solution temperature air cooling or furnace cooling were obtained. Author

N84-30067# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

INFLUENCE OF TEMPERATURE ON THE DELTA K SUB th AND da/dN OF LY-12CS ALUMINUM ALLOY

Mu Zaigin, Yin Huazi, and Tian Tiezhong *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 63-79 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/6

Central crack tension samples (CCT samples) in an air medium were used to test the fatigue threshold value Delta K (sub th) of LY-12CS aluminum alloy from room temperature to 250 C as well as the crack growth rate da/dN above the threshold value under 200 C three load ratio (R=0, 0.33, 0.67) conditions. Results showed that: (1) in the test temperature range, the threshold value Delta K (sub th) increased with the increases of the temperature; and (2) the rising temperature did not raise the crack growth rate da/dN below 250 C but lowered the da/dN. Under the conditions of three load ratios, Delta K ranged from 7 to 12 kg/mm(3/2) and the da/dN at room temperature was 1 to 3 times higher than that at 200 C. Author

N84-30068# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

PRELIMINARY INVESTIGATION OF FATIGUE CRACK PROPAGATION OF 30CrMnSIA STEEL IN SALT SPRAY CORROSION CONDITIONS

Ma Yushan, Yu Xiuling, Gou Baocheng, and You Dexuan *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 80-99 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/6

The method of fracture mechanics was used to make a preliminary study of the fatigue crack propagation characteristics of 30CrMnSiA structure steel in a salt spray medium and in room temperature air. Using compact tension samples, in the stress intensity range of Delta K = 70 to 200 kg/mm(3/2), the test results showed in the early stages of the tests, the crack propagation rate in salt spray medium was higher than in room temperature air and it sharply increased with the decrease of the test frequency. This type of situation is commonly caused by a hydrogen embrittlement mechanism. After the tests were carried out for 20 to 40 hours in the salt spray medium, due to the accumulation of corrosion products on the crack surface, the crack propagation rate gradually slows even below the da/dN curve in room temperature air. During the final stage of the test, because of the increase of the stress intensity range, the crack propagation rates in the two mediums were getting closer to each other. Author

N84-30069# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

STUDY OF THE FATIGUE CRACK PROPAGATION CHARACTERISTICS OF YB-3 AND YB-4 AERONAUTICAL ORGANIC GLASS

c27

Chen Ruoxi, Shao Yujun, and Fan Tang *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 100-120 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/2

The effects of the absorbed water and humid heat aging of the stress ratio and materials of an alternating load as well as the water environment on the fatigue crack propagation resistance characteristics of YB-3 and YB-4 aeronautical organic glass were studied. The moisture content, especially the water environment, had excellent effects on the crack resistance properties of two types of glass. Thus, it has important significance. Based on sectional microscopic observations, a micromechanism model for the crack subcritical propagation of organic glass under alternating loads was proposed. Author

N84-30070# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE EFFECTS OF NON-METALLIC INCLUSIONS IN STEEL ON FATIGUE PROPERTIES

Zhang Detang, Li Shuyuan, and Xia Huigin *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 121-139 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/6

The effects of inclusions in two types of steel, 38CrMoAlA and 30CrMnSiA, on fatigue properties are studied. The results show that under conditions wherein the inclusion content is basically the same, the size, shape and distribution characteristics have marked effects on fatigue life. The particle sizes of the inclusion directly control the nucleation and propagation of the cracks. When the mean diameter of the inclusion is larger than 40 microns, the proportion of fatigue failures caused by inclusions can reach above 95%. Therefore, on the basis of controlling the inclusion content, the fatigue properties are improved by decreasing the dimensions of the inclusion particles and changing the unfavorable geometric shapes and distribution. Author

N84-30071# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

CHARACTERISTICS OF INITIAL PERIOD FATIGUE CRACK PROPAGATION OF METALS AND ITS AFFECTING FACTORS

Yan Minggao *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 140-171 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/6

The mechanisms and characteristics of fatigue crack propagation in various metals and alloys at near-threshold range are reviewed. Test results from a series of microfractographic analyses of samples and structures showed that the fracture patterns which are predominantly produced at near-threshold range are the facets or river patterns. The interrelationship of the orientation of facets for different metals and alloys with crystal lattice structures was described with modes of slip and fault energy. A general trend of fatigue crack propagation characteristics was proposed under non-axial loading. The interrelationship between the fatigue limits of plain and notched samples and fatigue thresholds as well as the mechanism of the fatigue crack propagation in short cracks was evaluated. The infuences of stress ratio, microstructure and environment on fatigue crack propagation behavior at near-threshold range were also reviewed. Author

N84-29923*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
STRESS-CORROSION CRACK-GROWTH STUDY OF TITANIUM ALLOY TI-6AI-4V EXPOSED TO FREON PCA AND NITROGEN TETROXIDE MON-1
Roy A. Bjorklund *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 221-232 refs Sponsored in part by AFSD (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 11F

N84-29924# Textron Bell Aerospace Co., Buffalo, N. Y.
THE COMPATIBILITY OF MON-3 AND 301 CRYOFORMED STAINLESS STEEL
H. Ph. Heubusch and A. Orsini, (Arde Corp., Mahwah, N.J.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 233-244 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 11/6

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N84-30072*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF WATER-VAPOR ON FRICTION AND DEFORMATION OF POLYMERIC MAGNETIC MEDIA IN CONTACT WITH A CERAMIC OXIDE
Kazuhisa Miyoshi and Donald H. Buckley 1984 28 p refs Proposed for presentation at the Joint Lubrication Conf., San Diego, Calif., 22-24 Oct. 1984; sponsored by the American Society of Mechanical Engineers and the American Society of Lubrication Engineers
(NASA-TM-83727; E-1986; NAS 1.15:83727) Avail: NTIS HC A03/MF A01 CSCL 11C

The effects of humidity (water-vapor) in nitrogen on the friction and deformation behavior of magnetic tape in contact with a Ni-Zn ferrite spherical pin were studied. The coefficient of friction is markedly dependent on the ambient relative humidity. In elastic contacts the coefficient of friction increased linearly with increasing humidity; it decreased linearly when humidity was lowered. This effect is the result of changes in the chemistry and interaction of tape materials such as degradation of the lubricant. In plastic contacts there was no effect of humidity on friction below 40 percent relative humidity. There is no effect on friction associated with the breakthrough of the adsorbed water-vapor film at the interface of the tape and Ni-Zn ferrite. The coefficient of friction, however, increased rapidly with increasing relative humidity above 40 percent in plastic contacts. Author

N84-30073# General Dynamics Corp., Fort Worth, Tex.
ADHESIVE BOND AND COMPOSITE STRENGTH SCREENING SYSTEM DEVELOPMENTAL STUDY Final Report, Nov. 1981 - Mar. 1983
S. Y. Chuang, F. H. Chang, and J. R. Bell Atlantic City FAA Jun. 1984 54 p refs
(Contract DTFA03-81-C-00076)
(FZM-7184; FAA-CT-84-5) Avail: NTIS HC A04/MF A01

The results of an adhesive bond and composite strength screening system are summarized. A system based on the utilization of a high power ultrasonic (HPU) technique is developed. Several bonded structures: metal-to-metal, composite-to-composite, composite-to-metal, and composite-to-honeycomb core structures, are fabricated with various bonding conditions for system evaluation. The HPU power levels required to disrupt weak bonds without damaging good bonds in these structures are established. The ability of the system to screen weak bonds in some selected structures is successfully demonstrated. Analytical studies of HPU effects on bonded structures are also conducted. Further improvements and developments of the system are recommended and discussed. M.A.C.

N84-30074# Massachusetts Univ., Amherst. Dept. of Polymer Science and Engineering.
UNIAXIAL DRAW OF POLY(ETHYLENE OXIDE) BY SOLID STATE EXTRUSION Interim Technical Report
B. S. Kim and R. S. Porter 15 Aug. 1983 22 p
(Contract N00014-83-K-0228)
(AD-A141923; TR-20) Avail: NTIS HC A02/MF A01 CSCL 11/9

Ultradrawn filaments of poly(ethylene oxide) (PEO) have been prepared by a solid-state coextrusion in an Instron capillary rheometer. Two different molecular weights, 300,000 and 4,000, 000 were evaluated. Properties have been examined as a function of uniaxial draw ratio. The drawn filaments of PEO exhibit extremes of melting point, percent crystallinity, birefringence, and tensile modulus. Features of a PEO filament with a draw ratio of 32 are a 72 deg C DSC melting point and a crystallinity of 94.0%, both measured at a scan 2.5 deg C/min. The corresponding birefringence is 0.035 and a Young's modulus of 3.5 GPa. Author (GRA)

N84-30075# Massachusetts Univ., Amherst. Dept. of Polymer Science and Engineering.
CRYSTALLINE-STATE EXTRUSION OF LOW DENSITY POLYETHYLENES Interim Technical Report
C. Benelhadjsaid and R. S. Porter 15 Aug. 1983 331 p
(Contract N00014-83-K-0228)
(AD-A142017; TR-19) Avail: NTIS HC A15/MF A01 CSCL 13/8

Three low density polyethylene, one long branched (A) and two linear (B and C), have been solid-state extruded at several constant temperature from ambient to 8 deg C and to draw ratios < 8. The initial densities and melt indices of A, B and C are 0.920, 0.920 and 0.935 g/cc, and 1.9, 0.8 and 1.2 respectively. Melt-crystallized cylindrical billets were extended through conical dies in an Instron Capillary Rheometer. The linear polymers were found to draw by extrusion more readily than the branched; all three strain-harden. Density, birefringence, tensile and thermal properties have been evaluated as functions of extrusion temperature and draw ratio. Despite a measured loss via die swell, substantial orientation takes place during solid-state extrusion as evidenced by increases in transparency, birefringence and tensile modulus (up to 4.5 times that of the original isotropic polymer). Depending on the polymer and the draw temperature, density does go through a minimum or shows a monotonic increase with draw by extrusion. A minimum in modulus is also observed at low draw and at all draw temperatures for all three polymers. The highest tensile moduli achieved are 0.73, 0.46 and 1.5 GPa for A, B and C respectively at their highest draw ratio. The melting point for polymer B decreases with extrusion draw ratio, whereas it remains constant after a small initial drop, for the two others. For all three low density polyethylenes, birefringence increases rapidly with extrusion draw and then levels off at high draw. GRA

N84-30076# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.
THICKENER/FLUID INTERACTION IN LUBRICATING GREASES Interim Report, Mar. 1980 - Oct. 1983
J. G. Barbee and F. M. Newman May 1984 49 p
(Contract DAAK70-82-C-0001; DA Proj. 1L1-61102-AH-51)
(AD-A142276; AFLRL-173) Avail: NTIS HC A03/MF A01 CSCL 11/8

To allow a better understanding of the basic mechanisms of oil retention by grease thickeners, techniques were developed to extract the thickener from greases for microstructural study. An approach was developed to allow thickener coating of glass microbeads for use as column-packing media for High Performance

Liquid Chromatography (HPLC) evaluation of the thickener's molecular adsorption effects with base oils. Extensive testing of thickeners by HPLC under a variety of test conditions showed no resolvable changes in column retention times for different hydrocarbon types or base oil fractions. Considerable microstructural variation was detected between thickener types and thickeners of the same type from different manufacturers. This variation indicates that the effects of thickener microstructure on the containment of base oils by mechanical entrapment and capillary effects may have a greater influence on oil retention than the molecular adsorption mechanism. Author (GRA)

N84-30077# Illinois Univ., Urbana. Coordinated Science Lab.
EXPERIMENTAL STUDIES OF LATERALLY SEEDED RECRYSTALLIZED POLYSILICON ON SILICON DIOXIDE Ph.D. Thesis
S. K. Banerjee Jul. 1983 147 p
(Contracts N00014-79-C-0424; N00014-81-K-0431)
(AD-A142382; R-991; UILU-ENG-83-2212) Avail: NTIS HC A07/MF A01 CSCL 07/4

Single crystal silicon films have been grown on silicon dioxide covered silicon substrates by lateral epitaxy by seeded solidification using a scanned graphite strip heater. Various microscopy techniques have been used to establish that the films consist of large single crystal grains about 1 mm wide which extend indefinitely along the scan direction. These grains contain subgrain boundaries at about 25 micron intervals. The films are fairly smooth and show excellent single crystallinity. Boron and phosphorus implantations into these films have been studied by secondary ion mass spectrometry and Hall profiling. The diffusion properties of impurities in these films are similar to bulk silicon, the only differences being caused by the presence of the underlying silicon dioxide layer. GRA

N84-30078# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.
HIGH-TEMPERATURE LUBRICANTS FOR MINIMUM-COOLED DIESEL ENGINES Interim Report, Oct. 1980 - Nov. 1983
E. A. Frame Nov. 1983 78 p
(Contracts DAAK70-80-C-0001; DAAK70-82-C-0001; DA Proj. 1L7-62733-AH-20)
(AD-A142426; AFLRL-171) Avail: NTIS HC A05/MF A01 CSCL 11/8

Lubricant performance at high temperatures was defined using an uncooled single-cylinder diesel engine operated at conditions which simulate a minimum-cooled/adiabatic diesel engine. The following lubricant-related problems were observed: Lubricant oxidation--oil too thick to pump; corrosive products formed and bearings attacked; Lubricant volatility--high oil consumption, oil thickening, and Engine deposits--ring sticking. A variety of high-temperature candidate lubricants was evaluated in the uncooled single-cylinder diesel engine. While these two oils had the best overall high-temperature performance of the candidates tested, they were still deficient in oxidation stability/oil thickening properties. High-pressure differential scanning calorimetry (HPDSC) and FTM5308 were investigated for use as high-temperature lubricant bench screening methods. Neither method was completely satisfactory, and additional development of a bench oxidation screening technique is needed. GRA

N84-30079# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
SELF-PROPAGATING HIGH-TEMPERATURE SYNTHESIS OF CERAMICS IN VACUUM
W. F. Henshaw, A. Niiler, and T. Leete Apr. 1984 35 p
(DA Proj. 1L1-61102-AH-43)
(AD-A142506; AD-F300434; ARBRL-MR-03354) Avail: NTIS HC A03/MF A01 CSCL 11/2

Numerous ceramics have been formed using a process called Self-Propagating High-Temperature Synthesis (SHS). This process involves an exothermic, self sustaining reaction which propagates through a mixture of compressed powders. Propagation velocities are generally in the order of a few cm/sec. Over one hundred compounds, mostly the borides, carbides, nitrides and silicides of the transition metals, have reportedly been produced. Generally, the SHS process takes place at or greater than atmospheric pressure and is ignited by hot wires, thermites or sparks. At BRL, the reaction takes place in a vacuum chamber at a pressure of 10 to 100 mTorr and is ignited by an electron beam. The combustion processes are monitored and studied using high speed video analysis as well as optical spectroscopy. The ceramics formed by this process at BRL, which tend to be porous solids, are characterized by optical microscopy and X-ray crystallography. GRA

N84-30080# Honeywell, Inc., Bloomington, Minn. Corporate Physical Sciences Center.
STUDY OF MECHANO-CHEMICAL MACHINING OF CERAMICS AND THE EFFECT ON THIN FILM BEHAVIOR Final Technical Report, 1 Feb. - 31 Dec. 1983
H. Vora Feb. 1984 48 p
(Contract N00014-83-C-0270)
(AD-A142542) Avail: NTIS HC A03/MF A01 CSCL 11/4

Efforts have been made to mechanochemically polish polycrystalline ZrO_2, Nm-Zn ferrite, MgO, Al_2O_3, Si_3N_4, SiC, and B_4C. Measurements were made of the removal rates obtained by mechanochemically polishing above materials on a polyurethane impregnated polyester lap using a colloidal silica slurry as a polishing medium. These measurements indicate that the colloidal silica slurry polishes oxide ceramics at significantly higher removal rates than non-oxide ceramics. It is shown that a polishing medium consisting of Cr_2O_3 can mechanochemically polish non-oxide ceramics at significantly higher removal rates than the colloidal silica slurry. Because of the reactive nature of colloidal silica slurries, they are typically used in conjunction with polyurethane impregnated polyester of polyurethane foam laps. Employment of such non-rigid laps yields polished surfaces with orange-peel appearance (in the case of polycrystalline materials), excessive rounding at the edges and with flatness of no better than 1 lambda (lambda = 633nm) per centimeter in the center. Employing rigid linen phenolic laps, we have been able to get mechanochemically polished surfaces with flatness of approx. lambda/10 per centimeter, a little rounding at the edges and no orange-peel appearance. GRA

N84-30081# Lehigh Univ., Bethlehem, Pa. Materials Research Center.
CHARACTERIZATION OF BLOCK COPOLYMERS BASED ON POLY(3,3 -BIS(ETHOXYMETHYL)OXETANE) AND OTHER NOVEL POLYETHERS Semiannual Report
K. E. Hardenstine, C. J. Murphy (East Stroudsburg Univ., Pa.), R. B. Jones, L. H. Sperling (East Stroudsburg Univ., Pa.), and G. E. Manser (Thiokol Corp., Brigham City, Utah) 4 May 1984 41 p
(Contract N00014-82-K-0050)
(AD-A142606) Avail: NTIS HC A03/MF A01 CSCL 11/9

The present study involves crystalline block copolymers based on poly(3,3-bis(ethoxymethyl)oxetane, polyBEMO, and random copolymers based on other either forming monomers. The objective of the work is to generate a block copolymer consisting of crystallizable polyether end blocks based on poly (BEMO) and an amorphous rubbery center block based on the polyether random copolymers. This paper will examine the interrelationships among glass and melting transition behavior, viscoelastic characteristics, tensile properties, and morphological features of these new block copolymers. The properties of the block copolymers will be compared with those of the homopolymer poly(BEMO). GRA

N84-30082# Los Alamos Scientific Lab., N. Mex.
CERAMICS FOR FUSION DEVICES
Frank W. Clinard, Jr. 1984 9 p refs Presented at the ASM Conf. on Mater. for Future Energy Systems, Washington, D.C., 1-3 May 1984
(Contract W-7405-eng-36)
(DE84-011409; LA-UR-84-1354; CONF-840570-1) Avail: NTIS HC A02/MF A01

Ceramics are required for a number of applications in fusion devices, among the most critical of which are magnetic coil insulators, windows for RF heating systems, and structural uses. Radiation effects dominate consideration of candidate materials, although good pre-irradiation properties are a requisite. Materials and components can be optimized by careful control of chemical and microstructural content, and application of brittle material design and testing techniques. Future directions for research and development should include further extension of the data base in the areas of electrical, structural, and thermal properties; establishment of a fission neutron/fusion neutron correlation including transmutation gas effects; and development of new materials tailored to meet the specific needs of fusion reactors. DOE

N84-30083# California Univ., Berkeley. Lawrence Berkeley Lab.
LOW TEMPERATURE SINTERING OF Al2O-CaO Thesis
S. J. Wu Feb. 1984 68 p refs
(Contract DE-AC03-76SF-00098)
(DE84-010713; LBL-16959) Avail: NTIS HC A04/MF A01

Research was conducted to study the effect of CaO addition on the pre-eutectic densification of alpha alumina powders. Two sintering methods were used: (1) constant heating rate sintering, and (2) constant temperature sintering. The microstructure evolution was examined extensively by scanning and transmission electron microscopy and by X-ray diffractometry. It was found that the addition of CaO activates several mechanisms affecting the densification rate of Al2O3-CaO powder compacts. Among them, a solid solution effect and a second phase effect decreased the sintering rate. However, enhanced pre-eutectic densification effect was also observed within a narrow range of composition. DOE

N84-30084# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SURVEY OF THE PREPARATION, PURITY, AND AVAILABILITY OF SILANES
James H. Lorenz Dec. 1983 87 p refs
(Contract DE-AC02-83CH-10093)
(DE84-000090; SERI-STR-211-2092) Avail: NTIS HC A05/MF A01

Silane and disilane are currently available as prepared for the semiconductor market. Published or public information on preparative methods for monosilane and higher silanes are discussed. Purification techniques are reviewed. Data from current silane suppliers are tabulated. A short review of the silanes in Japan is given. Analytical procedures are not now perfected to determine group 3 or 5 elements in silane. All commercial silanes contain certain impurities. There is no simple one step purification technique for silane which a user could easily operate. Typical and actual analyses of commercial silane are given. Disilane is still in the development stage with only small quanitities available at very high prices. The silane process developed in part under the DOE/JPL Flat Plate Solar Array project by Union Carbide is summarized. Higher purity silanes are now appearing on the market. These should be useful in the photovoltaic area. DOE

N84-30085# Department of Energy, Washington, D. C.
CERAMIC TO METAL ATTACHMENT SYSTEM Patent Application
David D. Marchant, inventor (to DOE) Filed 10 Jun. 1983 8 p
(Contract DE-AC06-76RL-01830)
(DE84-011095; US-Patent-Appl-SN-503128) Avail: NTIS HC A02/MF A01

A composition and method are described for attaching a ceramic electrode to a metal conductor. A layer of randomly interlocked metal fibers saturated with polyimide resin is sandwiched between the ceramic electrode and the metal conductor. The polyimide resin is then polymerized providing bonding. DOE

N84-30086# Department of Energy, Washington, D. C.
GRAPHITE-CERAMIC RF FARADAY-THERMAL SHIELD AND PLASMA LIMITER Patent Application
David Li-shui Quek Hwang and Joel Carlton Hosea, inventors (to DOE) Filed 5 May 1983 18 p
(Contract DE-AC02-76CH-03073)
(DE84-010960; US-Patent-Appl-SN-491639) Avail: NTIS HC A02/MF A01

A brazing procedure is disclosed for joining a ceramic or glass material (e.g., Al2O3 or Macor) to graphite. The brazed ceramic graphic Faraday shield may be used in magnetic fusion devices (e.g., Princeton large torus Tokamak) or other high temperature resistant apparatus. DOE

N84-30087# California Univ., Berkeley. Lawrence Berkeley Lab.
HIGH RESOLUTION ELECTRON MICROSCOPY STUDIES OF THE EARLY STAGES OF DECOMPOSITION IN ALLOYS AND CERAMICS
R. Gronsky, G. vanTendeloo (Antwerp Univ., Belgium), and G. Thomas Mar. 1984 19 p refs Presented at the Acta/Scripta Conf., Sonnenberg, West Germany, 19 Sep. 1983
(Contract DE-AC03-76SF-00098)
(DE84-020802; LBL-17369; CONF-8309229-1) Avail: NTIS HC A02/MF A01

In this paper, some applications of high resolution electron microscopy to studies of the early stages of decomposition in alloys and ceramics is described. Two important parameters of the decomposition process, structural evolution and compositional variation, are specifically addressed. Since these applications push the limits of both image formation and computer simulation, a number of critical technique-related problems are identified. DOE

N84-30088# KMS Fusion, Inc., Ann Arbor, Mich.
COATED SILICA SHELLS: AN ADVANCED HYDROGEN STORAGE SYSTEM
Timothy M. Henderson and Alfred J. Martin 1984 5 p refs Presented at the 5th World Hydrogen Energy Conf., Toronto, 15 Jul. 1984
(Contract DE-AC08-82DP-40152)
(DE84-008986; CONF-840702-7) Avail: NTIS HC A02/MF A01

A new concept for the storage of hydrogen gas was investigated. It consists of storing hydrogen on a bed of small metal coated spherical shells of nearly pure silica composition. The silicon shells function as high pressure containers which because of silica's high strength, can withstand the pressures required to achieve significant gas storage densities. Since pure silica is too permeable to adequately retain hydrogen, a metal (e.g., Ni, Cu, Mo) coating is added as a room temperature permeation barrier. Fortunately, the rate at which hydrogen permeates these metals varies rapidly with temperature. Consequently, to cause the hydrogen to readily permeate the metal coating as well as the silica shell requires heating the bed to only moderate temperatures. DOE

N84-30089# California Univ., Davis. Dept. of Mechanical Engineering.
INVESTIGATION OF THE ROLE OF SINTERING IN GAS-SOLID INTERACTIONS Progress Report
Z. A. Munir May 1983 8 p
(Contract DE-AT03-80ER-10708)
(DE84-010862; DOE/ER-10708/T1) Avail: NTIS HC A02/MF A01

The following research has been done: an investigation of the influence of the decomposition of a precursor [Cd(OH)2] on the particle size of a ceramic product (CdO), and the influence of sintering on the reduction of iron oxides. DOE

N84-30090# Department of Energy, Washington, D. C.
METHOD AND APPARATUS FOR PRODUCING HIGH PURITY SILICON Patent Application
Jerry M. Olson, inventor (to DOE) Filed 27 May 1983 19 p
(Contract DE-AC02-77CH-00178)
(DE84-011087; US-Patent-Appl-SN-498999) Avail: NTIS HC A02/MF A01

A method for producing high purity silicon includes forming a copper silicide alloy and positioning the alloy within an enclosure. A filament member is also placed within the enclosure opposite the alloy. The enclosure is then filled with a chemical vapor transport gas adapted for transporting silicon. Finally, both the filament member and the alloy are heated to temperatures sufficient to cause the gas to react with silicon at the alloy surface and deposit the reacted silicon on the filament member. An apparatus for carrying out this method is also disclosed. DOE

N84-30091# Sandia Labs., Albuquerque, N. Mex.
ALKALI-FREE PHOSPHATE GLASSES FOR HIGH TEMPERATURE, HIGH ELECTRICAL RESISTIVITY APPLICATIONS
J. A. Wilder, Jr. Apr. 1984 25 p refs
(Contract DE-AC04-76DP-00789)
(DE84-011533; SAND-84-0510) Avail: NTIS HC A02/MF A01

Alkali-free phosphate glasses were developed in the BaO-B2O3-P2O5 and BaO-Al2O3-P2O5 systems. These glasses have glass transition temperatures greater than or equal to 500(0)C and coefficients of thermal expansion between 95 x 10(-70)C(-1) and 118 x 10(-70)C(-1). Electrical resistivities of approx. 10(11) OMEGA-cm at 223(0)C compare favorably with the resistivity of fused SiO2 of approx. 10(12) OMEGA-cm at 223(0)C. Hermetic seals with high strength, corrosion-resistant nickel superalloys were made. This combination of properties make these glasses candidate materials for high temperature applications where high electrical resistivity is required. DOE

N84-30092# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
JOINING SILICON NITRIDE BASED CERAMICS: A TECHNICAL ASSESSMENT
R. L. Tallman, R. M. Neilson, Jr., J. C. Mittl, S. P. Henslee, and P. V. Kelsey, Jr. Mar. 1984 67 p refs
(Contract DE-AC07-76ID-01570)
(DE84-011356; EGG-SCM-6572) Avail: NTIS HC A04/MF A01

A glass as a joining material can flow to fill a joint, react to bond, and anneal to relieve stress. An oxynitride glass can bond to silicon nitride and be strengthened itself, by devitrification, most preferably by epitaxial deposition of silicon nitride. Basic studies of such brazing-type joining and of oxynitride glass joining materials and their properties can have wide applicability. Exotic welding-type joining techniques, however, are severely limited in applicability by associated restraints on joint size and configuration and by the heating required to prevent cracking of the ceramics by thermal gradients. The development of broadly applicable basic information on joining techniques and joining materials is required. A literature review of 141 reports is used to assess current technology in this area. DOE

N84-30093# Linkoeping Univ. (Sweden). Lab. for Applied Physics.
THE PHOTOELECTROCHEMISTRY OF CONDUCTING POLYMERS
Olle Inganaes, Terje A. Skotheim, and Ingemar Lundstroem 1983 32 p refs Prepared in cooperation with Brookhaven National Lab.
(Contract DE-AC02-76CH-00016)
(DE84-010889; BNL-34594) Avail: NTIS HC A03/MF A01

It was concluded that conducting polymers were used to, at least partially, solve one of the fundamental problems of semiconductor photoelectrochemistry, namely photocorrosion of small handgap semiconductor photoelectrodes. The high electronic conductivity in combination with large surface area imply unique possibilities for surface modification. Incorporation of catalysts in the electronically conducting polymer opens up new possibilities for directing photoprocesses to fuel production. And, finally, even though some properties of conducting polymers render them interesting for active photovoltaic energy conversion in electrochemical systems, the low rate of photogeneration of charge carriers is still a limiting problem. DOE

N84-30094# Sandia Labs., Albuquerque, N. Mex.
QUALITY CONTROL ANALYSIS OF TA-23 GLASS SEALS FOR LITHIUM AMBIENT TEMPERATURE BATTERIES
C. Nelson Apr. 1984 21 p refs
(Contract DE-AC04-76DP-00789)
(DE84-011719; SAND-83-2670) Avail: NTIS HC A02/MF A01

It is shown that large variations in glass composition, which severely reduces corrosion resistance, cannot be detected by measurements of physical properties. Chemical analyses are required to qualify a glass. Modest variations in the sealing and annealing temperatures do not affect the strength or corrosion resistance of the seal. DOE

N84-30095# Sandia Labs., Albuquerque, N. Mex.
LEAD ZIRCONATE-LEAD TITANATE (PZT) CERAMICS FROM ORGANIC-DERIVED PRECURSORS
R. G. Dosch 1984 7 p refs Presented at the Symp. on Better Ceramics Through Chem., Albuquerque, N. Mex., 27 Feb. 1984
(Contract DE-AC04-76DP-00789)
(DE84-009921; SAND-83-1949C; CONF-840288-1) Avail: NTIS HC A02/MF A01

Organic-derived precursors can facilitate the preparation of lead zirconate-lead titanate ceramics, particularly in the areas of processing and batch reproducibility. The use of partially alkoxide-derived precursors and completely organic-derived precursors was studied. Two methods of alkoxide hydrolysis were evaluated for preparing zirconia which included direct hydrolysis in water and hydrolysis of alkoxide-base reaction products in acetone-H2O mixtures. The chemistry of these methods is discussed along with pertinent aqueous surface chemistry of the hydrated zirconia products. This work suggests that alkoxide-derived precursor properties are related to the solution chemistry used in their preparation. DOE

N84-30096# Hoechst A.G., Gendorf (West Germany).
FLUOROTHERMOPLASTICS FOR LONG LIFE, WEATHERPROOF COMPOSITES Final Report, Dec. 1982
Johannes Brandrup and Hans-Juergen Hendriock Bonn Bundesministerium fuer Forschung und Technologie May 1984 40 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-082; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,50

A thermoplastic fluoropolymer was developed for coating material made from organic or inorganic fibers with a long time service temperature up to 130 C and a long term weatherproofness (more than 10 years), flame resistance, dirt resistance, and good weldability. The development is almost finished, while the system polymer/textile material needs further optimization. A melt adhesive for this system was developed. Author (ESA)

N84-30097# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
THE EFFECTS OF STRAIN RATE AND TEMPERATURE ON THE FRACTURE BEHAVIOR OF THREE STRUCTURAL ADHESIVES
W. vanderHoeven 24 Aug. 1983 73 p refs
(Contract NIVR-1722)
(AD-B084418; NLR-TR-83099-U) Avail: NTIS HC A04/MF A01

The effects of strain rate and temperature on the fracture behavior of the structural adhesives Redux 775, Metlbond 328 and EC 2216 were investigated using double cantilever beam specimens. Critical elastic energy release rate data (G) were used to characterize resistance against cracking in the adhesives. Strain rate effects are unimportant. However, decreasing the test temperature below room temperature lowers the G of Redux 775 and EC 2216. The G for EC 2216 decreases at elevated temperatures. For Metlbond 328 there is a slight tendency to lower G values with decreasing temperature. For Redux 775 and EC 2216, the use of G to describe mode 1 crack resistance is only valid at low temperatures (-50 C). However, G can be used for Metlbond 328 over the entire range of temperatures investigated (-50 C to +60 C). Author (ESA)

N84-30098# Bureau of Mines, University, Ala.
CORROSION RESISTANCE OF SELECTED CERAMIC MATERIALS TO NITRIC ACID
James Philip Bennett Feb. 1984 19 p refs
(PB84-178870; BM-RI-8851) Avail: NTIS HC A02/MF A01 CSCL 11B

The Bureau of Mines is investigating the acid resistance of ceramic materials to identify construction materials for emerging technology in chemical and metallurgical processes. Eight commercial ceramic materials including two red shale, two fireclay, a silica, a silicon carbide, a carbon, and a high-alumina brick, were evaluated. Samples were exposed to 40 wt pct HNO3 at 70 and 90 C and 60 wt pct HNO3 at 50, 70, and 90 C for time periods of 110 days. Statistically significant changes in cold crushing strength were generally small or not detected, except for a strength drop in the high-alumina brick, which decreased in strength when exposed to the chosen acid concentrations at 90 C. Volume and weight changes were also measured. The leach rates of Al, Ca, Fe, K, Mg, Na, Si, and Ti were monitored. Author (GRA)

N84-30099# Bureau of Mines, University, Ala.
MAGNESIA REFRACTORIES PRODUCED FROM CHEMICALLY MODIFIED PERICLASE GRAINS AND Mg(OH)2 SLURRIES
James Philip Bennett and Timothy A. Clancy Feb. 1984 21 p refs
(PB84-178979; BM-RI-8848; LC-83-600349) Avail: NTIS HC A02/MF A01 CSCL 11B

Based on previous Bureau of Mines research indicating that improved high-temperature properties could be achieved for periclase refractories through chemical additions, the Bureau investigated the properties of full-size bricks produced from chemically modified periclase refractory grains and the suitability of making such chemical additions to Mg(OH)2 slurries prior to production of the periclase grains. In full-size brick testing, strength values, both hot and cold, for the optimized bricks were superior to those for a commercial 98-wt-pct-MgO refractory. The best results were obtained for a natural magnesite with an adjusted CaO:SiO2(C:S) ratio of 3.0 and a 1.0-wt-pct addition of ZrO2 and for a seawater periclase with an adjusted C:S ratio of 2.5 and a 0.5-wt-pct addition of MnO2. Author (GRA)

N84-30100# National Bureau of Standards, Washington, D.C. Inorganic Materials Div.
CHARACTERIZATION OF ORGANOMETALLIC POLYMERS BY CHROMATOGRAPHIC METHODS AND NUCLEAR MAGNETIC RESONANCE, PART 2
E. J. Parks, W. F. Manders, R. B. Johannesen, and F. E. Brinckman Feb. 1984 56 p refs Prepared for Naval Ship Research and Development Center, Annapolis, Md.
(PB84-183599; NBSIR-83-2802-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 07D

Continuing research into the analytical methodology for characterization of organometallic polymers (OMPs) produced improved methods of characterization by size exclusion chromatography (SEC) and Fourier transform nuclear magnetic resonance (FTNMR). Molecular weight (MW) and MW dispersion (MWD), as well as the amount of tin associated with fractions of various MW can now be reliably determined by SEC coupled with various detectors: differential refractive index (delta RI), ultraviolet (UV), and graphite furnace atomic absorption (GFAA) spectroscopy. All of the polymers examined are approximately 80 percent racemic (r) and 20 percent meso (m) in tacticity (i.e., predominantly syndiotactic). Author (GRA)

N84-30101# Bureau of Mines, Albany, Oreg.
SULFIDATION- AND OXIDATION-RESISTANT FERRITIC STAINLESS STEEL CONTAINING ALUMINUM
J. S. Dunning 1984 22 p refs
(PB84-189521; BM-RI-8856; LC-83-600350) Avail: NTIS HC A02/MF A01 CSCL 11J

Recent developments in energy conversion, mining and minerals processing, pollution control, and chemical equipment have placed increased demands on heat-resistant alloys. Higher corrosion rates from oxidation, hot corrosion, and sulfidation have increased consumption of materials that contain critical and strategic minerals and in many cases have limited productivity. The substitute materials are based on Fe-Cr-Ni-Al compositions. Aluminum additions to the Fe-Cr-Ni alloys significantly improve high-temperature corrosion resistance, particularly sulfidation resistance. In the alloy, devised by Bureau researchers, aluminum additions are held in the form of a second-phase precipitate, beta-NiAl. Minor additions of Ti, Mn, and Si improve workability. Mechanical properties approach those of type 310 stainless steel. Author (GRA)

N84-29947# Morton Thiokol, Brigham City, Utah.
NITRATE ESTER POLYETHER GLYCOL PREPOLYMERS
G. E. Manser *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 71-74 refs (For primary document see N84-29939 20-20)
(Contract N00014-82-C-0800)
Avail: NTIS HC A15/MF A01 CSCL 11/3

N84-29960# Akron Univ., Ohio. Inst. of Polymer Science.
DURABILITY OF ADHESIVE BONDS WITH IONIC BONDS AT THE INTERFACE
P. Dreyfuss and F. Liang *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 227-234 refs (For primary document see N84-29939 20-20)
(Contract N00014-76-C-0408)
Avail: NTIS HC A15/MF A01 CSCL 11/1

N84-30069# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
STUDY OF THE FATIGUE CRACK PROPAGATION CHARACTERISTICS OF YB-3 AND YB-4 AERONAUTICAL ORGANIC GLASS
Chen Ruoxi, Shao Yujun, and Fan Tang *In its* Aeron. Mater. (Selected Articles) (FTD-ID(RS)T-1868-83) 13 Mar. 1984 p 100-120 refs Transl. into ENGLISH from Hangkong Cailiao (China), v. 2, no. 2, 1982 (For primary document see N84-30063 20-26)
Avail: NTIS HC A09/MF A01 CSCL 11/2

N84-30868# Joint Publications Research Service, Arlington, Va.
IMPACT OF LASER RADIATION ON OPTICAL PROPERTIES OF POLYMER LIQUID CRYSTAL IN PHASE TRANSITION RANGE Abstract Only
S. A. Ivanov, I. A. Yakovlev, V. Yu. Vetrov, S. G. Kostromin, and V. P. Shibayev *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 5-6 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1349-1353 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N84-30102 British Library Lending Div., Boston Spa (England).
EXPLOSION PARAMETERS OF FERROALLOY DUSTS
I. V. Babaitsev and A. K. Toleshov 29 Mar. 1984 3 p refs Transl. into ENGLISH from Izv. (USSR), no. 7, 1983 p 153
(BLL-M-35571-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Expanded use of ferroalloys in steelmaking, casting, and electrode production requires that the possibility and parameters of explosion of their atmospheric suspensions be determined. A 1 cu m test chamber was used to investigate explosion parameters for ferromanganese, ferrotitanium, and ferrosilicon. The 1 cu m test chamber, which is a larger capacity than those currently employed, was demonstrated to be necessary to determine the true explosion parameters of ferroalloy dusts or even the possibility of their exploding. R.S.F.

N84-30103# Institute of Space and Astronautical Science, Tokyo (Japan).
AN MPD THRUSTER WITH LIQUID METAL INJECTION

Takao Doi Mar. 1984 54 p refs
(ISAS-610; ISSN-0285-6808) Avail: NTIS HC A04/MF A01

The feasibility of direct injection of liquid metal propellant in the Magneto Plasma Dynamic (MPD) thruster system was investigated. Thrust, plasma exhaust velocity, current, and terminal voltage were measured. The experimental model thruster consists of rail-type electrodes and an on-off control valve; the model was tested with a non-reversing current pulse of 1.9 msec duration. The quasi-steady operation was established. The plasma exhaust velocity reached more than 10,000 m/sec, and the thrust-power ratio of 25 N/kW was obtained. The transition process from liquid to plasma was investigated through the kinetic evaporation mechanism and one-dimensional magnetohydrodynamic flow model. The MPD thruster system has the capability of unsteady, quasi-steady, and steady operations. Author

N84-30104# California Univ., Livermore. Lawrence Livermore Lab.
THE EVAPORATION AND GASEOUS DISPERSION OF LARGE-SCALE RELEASES OF NITROGEN TETROXIDE
T. G. McRae, H. C. Goldwire, Jr., and R. P. Koopman 6 May 1984 22 p
(Contracts W-7405-eng-48; MIPR-N-84-18)
(AD-A142079; DE84-012267; UCRL-89687; CONF-8405183-1) Avail: NTIS HC A02/MF A01 CSCL 21/9

A series of large-scale spills 3-5 cubic m) of nitrogen tetroxide (N2O4) was performed at the Nevada Test Site (NTS) for the Air Force Engineering and Services Laboratory, Environics Division. The purpose of these experiments was to study the evaporation rates and heavy gas dispersion aspects of realistic size releases of N2O4, a rocket fuel oxidizer for the Titan II missile system. The Titan II complexes are currently being decommissioned, resulting in an increase in the overland transportation of this toxic material. The normal boiling point for the liquid N2O4 is 21 deg C hence it evaporates rapidly when spilled onto warm soil and quickly dissociates into nitrogen dioxide (NO2) as it mixes with air. The NO2 is highly toxic with an ACGIH threshold limit value 3 parts per million (ppm). The design of the spill facility and the diagnostics are described. Some typical results for one of the spills are presented. The data include the atmospheric boundary layer conditions in effect during the spill, the spill area heat flux and vapor temperature, the vapor flux measured at 25 meters (m) downwind, and the NO2 gas concentration contours at 785 m. A comparison of the measured NO2 concentration and that calculated with the Air Force Ocean Breeze/Dry Gulch (OB/DG) model is discussed. Author (GRA)

N84-30105# Morton Thiokol, Brigham City, Utah.
HIGH ENERGY BINDERS Quarterly Letter, 1 Mar. - 31 May 1983
21 Jun. 1983 12 p
(Contract N00014-82-C-0800)
(AD-A142347; QL-2) Avail: NTIS HC A02/MF A01 CSCL 11/1

Research efforts have continued in the areas of monomer synthesis, including non-energetic monomers for the thermoplastic elastomers, polymer synthesis, and polymer characterization. Also initiated were the determination of reactivity ratios of new monomers and the thermal depolymerization/decomposition of polyethers by thermogravimetric analysis. Two new monomers were synthesized during this reporting period for use in imparting internal plasticization to poly(THF). The first, 3-octoxymethyl-3-methyl-oxetane (OMMO) was readily prepared in high yield by the reaction of octyl bromide on the sodium salt of 3-hydroxymethyl-3-methyloxetane in dioxane. The second monomer, bis (methoxyethoxy methyl)oxetane (BMEMO) was prepared by the action of bis(chloromethyl)oxetane on the sodium salt of methoxyethanol in excess methoxy-ethanol. Both monomers were isolated at > 99% purity by vacuum distillation from sodium hydride. In order to develop thermoplastic elastomer with highly elastomeric properties, we have synthesized two new polymers based on poly(THF) using OMMO and BMEMO as comonomers. Two polymers were prepared: poly(THF/OMMO) and poly(THF/BMEMO) with a molecular weight of 20,000. Both polymers were found to have very low viscosity upon isolation and visually can be called internally plasticized. As time permits, each will be incorporated into a thermoplastic elastomer with poly(BEMO) as the crystalline block. GRA

N84-30106# Bureau of Mines, Bartlesville, Okla. National Inst. for Petroleum and Energy Research.
AVIATION FUELS, 1983
E. M. Shelton and C. L. Dickson Apr. 1984 18 p refs
(Contract DE-FC01-83FE-60149)
(DE84-011823; NIPER-134-PPS-84/2) Avail: NTIS HC A02/MF A01

Properties of some aviation gasolines and aviation turbine fuels marketed in the United States during 1983 are presented. The samples represented are typical 1983 production and were analyzed in the laboratories of 12 manufacturers of aviation gasolines and 18 producers of aviation turbine (jet) fuels. The data were submitted for study, calculation, and compilation under a cooperative agreement between the National Institute for Petroleum and Energy Research (NIPER), Bartlesville, Oklahoma, and the American Petroleum Institute (API). Results for properties of 34 samples of grades 80/87, 100/130, and 100LL for aviation gasolines, and 104 samples of military grades JP-4 and JP-5, and commercial type Jet A for aviation turbine fuels are included. DOE

N84-30107# California Univ., Livermore. Lawrence Livermore Lab.
HIGH PERFORMANCE EXTRUSION CAST EXPLOSIVES (ECX)
Kenneth J. Scribner Feb. 1984 24 p refs Presented at the Technol. of Propellants and High Explosives Ann. Conf., Fraunhofer, West Germany, 27-29 Jun. 1984
(Contract W-7405-eng-48)
(DE84-008244; UCRL-90376; CONF-8406103-1) Avail: NTIS HC A02/MF A01

A high energy explosive system for use in precision, high performance munitions is described. The explosive has an energy/density greater than 78% Octol. It is similar to modern type cast/cure explosives except that it possesses higher apparent viscosities since low pressure hydraulic systems are used for deaeration and casting of the explosive. Any desired device configuration is loaded. The crystalline HMX has a nominal particle size which contributes to an extremely smooth detonation front. This explosive is suitable for use in the most critical applications such as shaped charges and self forging fragment systems. DOE

N84-30108# Mobil Research and Development Corp., Paulsboro, N.J.
TWO-STAGE PROCESS FOR CONVERSION OF SYNTHESIS GAS TO HIGH QUALITY TRANSPORTATION FUELS Quarterly Report, 8 Jun. - 30 Sep. 1983
J. C. W. Kuo Nov. 1983 44 p refs
(Contract DE-AC22-83PC-60019)
(DE84-009624; DOE/PC-60019/1) Avail: NTIS HC A03/MF A01

The design of two large hot-flow models, to be used for slurry bubble-column hydrodynamic studies, is described. Scoping experiments were performed in smaller models to study the effects of feed-gas distributor type, column diameter, and liquid medium on gas holdup and bubble sizes. In addition, a literature review of bubble-column hydrodynamics is presented. Modifications to improve the operation and flexibility of the existing two stage pilot plant were designed and construction initiated. Also, a sample of reactor-wax was fractionated under vacuum in a laboratory still. DOE

N84-30109# Pittsburgh Univ., Pa. Dept. of Chemical and Petroleum Engineering.
PROMOTION EFFECTS ON THE SYNTHESIS OF HIGHER ALCOHOLS Quarterly Report, Dec. 1983 - Feb. 1984
J. G. Goodwin, Jr. and S. C. Chuang Mar. 1984 14 p refs
(Contract DE-FG22-82PC-50810)
(DE84-009916; DOE/PC-50810/T6; QR-6) Avail: NTIS HC A02/MF A01

A study of CO hydrogenation over alkali-promoted Rh/TiO2

catalysts was carried out by addition of ethylene to clarify the alkali promotion effect on the specific reactions in this synthesis. The following conclusions for Rh/TiO2 catalysts can be drawn: the active sites for oxygenate formation during CO hydrogenation over Rh/TiO2 are not sensitive to the chemical nature of the alkali promoter while the active sites for hydrocarbon formation are strongly dependent upon the chemical properties of the alkali promoter; K and Cs promoters significantly suppress ethylene incorporation into higher hydrocarbons; the hydrogenation ability of Rh/TiO2 catalysts decreases in the order: umpromoted > Li > K > Cs. Finally, the addition of small quantities of ethylene to the reactant stream provided an excellent way to probe modifications in a number of the reactions as a result of alkali promotion.
DOE

N84-30110# California Univ., Berkeley. Lawrence Berkeley Lab.
NUTRITIONAL AND ENVIRONMENTAL FACTORS IN ETHANOL FERMENTATION BY SACCHAROMYCES CEREVISIAE Ph.D. Thesis
H. Wong, C. R. Wilke, and H. W. Blanch May 1983 285 p refs
(Contract DE-AC03-76SF-00098)
(DE84-009693; LBL-17481) Avail: NTIS HC A13/MF A01

Using Saccharomyces cerevisiae as a model system, a basic study of the nutritional and environmental factors in ethanol fermentation was carried out to provide fundamental and practical bases for design of fermentation media and culture conditions. the requirements for all active medium components need to be determined in order to establish balanced media, which are important to reduce raw materials costs and to minimize inhibition from buildup of excess feed components in recycle processes with selective ethanol removal. Biotin, pantothenate, myo-inositol, potassium and phosphates appeared to stimulate growth preferentially to ethanol production. In contrast, thiamine and pyridioxine appeared to enhance specific ethanol productivity. The effect of ammonium sulfate depended on concentration. A conceptual model was proposed to relate the effects of these nutrients to biochemical pathways and functions. With these data and model the minimum cost combination of raw materials to achieve a medium of well defined components can be determined with a linear program.
DOE

N84-30111# Cummins Engine Co., Inc., Columbus, Ind.
UTILIZATION OF SRC-2 FUEL IN AN INSULATED DIESEL ENGINE Final Technical Report
Ralph J. Slone and Roy Kamo 1984 121 p refs
(Contract DE-AC03-79ET-15450)
(DE84-004386; DOE/ET-15450/T29) Avail: NTIS HC A06/MF A01

The efforts to determine the capability of the uncooled and adiabatic engines, with their high in cylinder temperatures, to burn poor quality low cetane fuels are discussed. Three NH cylinder engine configurations: a conventional cooled, an uncooled, and an adiabatic were assembled and tested for performance and emissions. Diesel baseline fuel No. 2, shale, and coal derived fuels are burned in each of the above engine configurations. Engine fuel sensitivity to poor quality low cetane fuels is significantly reduced or eliminated by the uncooled and adiabatic engines. The low cetane number EDS and SRC-II fuels give a combustion quality (ignition timing and noise levels) equivalent to No. 2 diesel fuel when burned in the adiabatic engine at optimum intake air temperatures and air fuel ratios and emissions and performance.
DOE

N84-30112# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
CHEMICAL-HYDROGEN ENERGY SYSTEMS Annual Report, 1 Jan. - 31 Dec. 1983
May 1984 107 p
(Contract DE-AC02-76CH-00016)
(DE84-012876; BNL-51747) Avail: NTIS HC A06/MF A01

Progress made by private sector contractors, university researchers, and the Brookhaven National Laboratory (BNL) in-house technical staff is summarized for work in electrolytic hydrogen production, hydrogen storage, materials, and transport systems. Federal guidelines and budgetary allocations are reflected in BNL R and D planning and implementation, where emphasis is placed on developing a technology base for hydrogen which would be used for coupling the abundant/renewable energy resources to the demand sector uses in the far term. The key projects summarized relate to hydrogen generation via water vapor electrolysis, anode depolarizaton concepts, hydrogen embrittlement of pipeline steels, and the completion of a hydrogen technology evaluation facility. Related International Energy Agency cooperative efforts as well as plans and major activities scheduled for 1984 are included.
DOE

N84-29909*# National Aeronautics and Space Administration. White Sands Test Facility, N. Mex.
IRON NITRATE AND MON-3 NITROGEN TETROXIDE
I. D. Smith *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 19-28 (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21I

N84-29920*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PURIFICATION OF NITROGEN TETROXIDE FOR LONG-TERM RELIABILITY
C. M. Moran and G. D. Blue *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 195-200 refs Sponsored in part by AFSD (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21I

N84-29921# Martin Marietta Aerospace, Denver, Colo.
HYDROGEN FLUORIDE FORMATION AND METAL CORROSION IN FREON-CONTAMINATED PROPELLANTS
T. J. Giordano, C. H. Mosher, E. A. Kern, and C. S. Geoffroy *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 201-214 refs (For primary document see N84-29906 20-20) (Proj. D01-R)
Avail: NTIS HC A17/MF A01 CSCL 21/9

N84-29922# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
ELECTROSTATIC FILTRATION OF N2O4 FOR REMOVAL OF SOLID AND VAPOR CONTAMINANTS
P. Mahadevan and P. Breisacher *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 215-220 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/9

N84-29926# Rocketdyne, Canoga Park, Calif.
LOX/CH4 FOR REUSABLE HIGH PERFORMANCE BOOSTER ENGINES
F. M. Kirby *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 1 Feb. 1984 p 253-260 refs (For primary document see N84-29906 20-20)
Avail: NTIS HC A17/MF A01 CSCL 21/9

N84-29946# Talley Industries of Arizona, Inc., Mesa.
HIGH PERFORMANCE, LOW FLAME TEMPERATURE NITRAMINE PROPELLANT DEVELOPMENT
M. L. Moore, P. H. Graham, and N. H. Lundstrom (Lundstrom Technical Services, Tacoma, Wash.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 59-70 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/9

N84-29950# Atlantic Research Corp., Gainesville, Va.
A TRACTABLE THEORY FOR NONLINEAR PROPELLANT RESPONSE AND CUMULATIVE DAMAGE PREDICTIONS
A. J. Mikeska *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 97-106 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/9

N84-29951# United Technologies Corp., San Jose, Calif.
NONLINEAR STRUCTURAL CHARACTERIZATION OF SOLID

PROPELLANTS
E. C. Francis and W. M. Fisher *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 107-116 refs (For primary document see N84-29939 20-28)
(Contract F04611-80-C-0052)
Avail: NTIS HC A15/MF A01 CSCL 21/9

N84-29955# United Technologies Corp., San Jose, Calif. Chemical Systems.
KEVLAR-49/EPOXY CASE SKIRT STRUCTURAL FATIGUE STRENGTH
H. M. Reynolds and R. R. Hood *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 155-182 Prepared for Hughes Aircraft Co., Los Angeles (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/9

N84-29956# Olin Corp., Marion, Ill. Ordnance Products.
SYNTHESIS OF DIAZIDODIESTERS
A. K. Mehrotra and Indu B. Mishra *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 183-198 refs (For primary document see N84-29939 20-20)
Avail: NTIS HC A15/MF A01 CSCL 21/9

N84-29963# Northwestern Univ., Evanston, Ill. Dept. of Mechanical Engineering.
ORGANIC AZIDES AS JET FUEL ADDITIVES: SYNTHESIS OF AZIDES AND MICRO-EXPLOSION CHARACTERISTICS OF DROPLETS
C. K. Law, C. H. Wang, L. C. Clausen, A. Lee, R. M. Moriarty, B. R. Bailey, S. C. Engerer, and R. S. Miller (ONR, Arlington, Va.) *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 251-260 refs Prepared in cooperation with Illinois Univ., Chicago (For primary document see N84-29939 20-20)
(Contracts N00014-83-K-0207; N00014-83-K-0306)
Avail: NTIS HC A15/MF A01 CSCL 21/4

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N84-30113# California Univ., Livermore. Lawrence Livermore Lab.
DESIGN OF A SAFETY MONITOR SYSTEM FOR HIGH EXPLOSIVES MACHINING
L. E. Newton, J. D. Garske, F. Y. Shimamoto, and R. K. Yamauchi 28 Nov. 1983 42 p
(Contract W-7405-eng-48)
(DE84-010101; UCID-20034) Avail: NTIS HC A03/MF A01

A computerized safety monitor system was designed and installed on a Bostomatic Mill/Lathe at Site 300. Previous safety modifications made to the machine and the objectives, design features, system analysis, hardware, software, and possible industrial application for the monitor system are described. The appendices detail the system analysis and the start up procedure for the system. DOE

N84-30114# Institute of Space and Astronautical Science, Tokyo (Japan).
PROCEEDINGS OF THE SYMPOSIUM ON MECHANICS FOR SPACE FLIGHT
Koichi Oshima, ed. Mar. 1984 112 p refs Symp. held in Tokyo, 24-26 Nov. 1983
(ISAS-SP-2; ISSN-0285-6808) Avail: NTIS HC A06/MF A01

Aspects of computational fluid dynamics, rarefied gas dynamics, thermophysics, heat pipes, and guidance and control are discussed. For individual titles, see N84-30115 through N84-30127.

N84-30115# Chiba Univ. (Japan). Dept. of Mechanical Engineering.
RANDOM-CHOICE SOLUTIONS FOR TWO-DIMENSIONAL AND AXISYMMETRIC SUPERSONIC FLOWS c02
H. Honma, M. Wada, and K. Inomata *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 3-14 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF a01

A two-dimensional random-choice code was developed to compute the steady two-dimensional and axisymmetric supersonic inviscid flows over arbitrary body shapes. A two-dimensional Riemann problem is solved for each spatial mesh at each spatial step marching downstream in one way. Its solution is constructed by a combination of an oblique shock wave and a Prandtl-Meyer expansion wave. An extended Godunov's iterative technique is developed to get the solution. The oblique coordinates and an operator-splitting technique are employed which permits the code to march along the body surface and to apply the axisymmetric flow. The computed shock positions and pressure distributions for a confluence of two-dimensional supersonic jets (shock-tube analogy) and for flows over a diamond airfoil and a cone are found to be in good agreements with analytical ones. A conical N-wave solution is obtained in a supersonic flow over a double cone by combining the oblique coordinates with the operator-splitting technique. Author

N84-30116# Nagoya Univ. (Japan). Dept. of Applied Physics.
NUMERICAL ANALYSIS OF THE BURST IN THE TURBULENT BOUNDARY LAYER, BASED ON THE THREE-DIMENSIONAL ORTEX MODEL c34
Sinzi Kuwabara *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 15-21 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

The burst phenomenon in the turbulent boundary layer (occurrence of the high shear layer due to a lifted and stretched vortex element in the outer portion of the buffer layer and the breakdown of the high shear layer due to its instability) is studied numerically. It is assumed that the viscous effect and the flow direction dependence of the undisturbed boundary layer flow can be neglected. An expression is given for basic mean flow velocity profile from the wall up to the log-layer. The empirical formula of the basic boundary layer velocity profile represents it as is linear in the vicinity of the wall and logarithmic far from the wall. The comparison of this empirical formula with data of the turbulent boundary layer along a flat plate, of the turbulent duct flow, and the turbulent Hagen-Poiseuille flow give good agreement. Representation of the unperturbed basic flow as a system of infinite vortex filaments is discussed. A.R.H.

N84-30117*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ELLIPTIC GRID GENERATION FOR THREE-DIMENSIONAL GEOMETRIES c64
Kozo Fujii *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 23-28 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01 CSCL 12A

A method is developed for generating three-dimensional, finite difference grids about complicated geometries by using Poisson equations. The inhomogeneous terms are automatically chosen such that orthogonality and spacing restritions at the body surface are satisfied. Spherical variables are used to avoid the axis singularity, and an alternating direction implicit solution scheme is used to accelerate the computations. Since all of the results presented were used as grids for flow-field computations in success the method is a useful tool for generating three-dimensional grids about complicated geometries. Author

N84-30118# Institute of Space and Astronautical Science, Tokyo (Japan).
NUMERICAL SIMULATION OF AUTOROTATION c34
Naoki Izutsu and Yuko Oshima (Ochanomizu Univ.) *In its* Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 29-41 refs

(For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

The autorotation of an elliptic cylinder around its spanwise axis fixed perpendicularly in a uniform flow was numerically simulated using discrete vortex-blob method and compared with experimental results using wind tunnel and water channel. The flow fields around the cylinder driven externally with constant angular velocity were investigated, and the effects of the moment of inertia and of the thickness ratio of the cylinder on the starting condition of autorotation were analyzed, which clarified the mechanism of autorotation. That is, the driving force is due to sheddin of the vortex clingin behind the retreating edge. The cylinders with sufficiently large moments of inertia rotate with constant angular velocity, whereas those with smaller one induce periodic variation of angular velocity. The cylinders with smaller moment of inertia than a critical value cannot sustain autorotation. It was also found that the autorotation frequency increases as the thickness ratio of the elliptic cylinder decreases, and eventually reaches the maximum values which is larger than the one of a flat plate. Author

N84-30119# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
FREEJETS OF ROTATIONALLY RELAXING DIATOMIC GASES c34
Michio Nishida and Hideyuki Kobayashi *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 43-50 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

Numerical solutions for the freejet expansion flow of rotationally relaxing diatomics gases were obtained by the operator splitting method and two-step Lax-Wendroff scheme. Computational results of the translational and rotational temperature distributions are shown for four cases of the ratio of the characteristic times for the flow and rotational relaxation which characterizes a rotational nonequilibrium flow. The results show that as this ratio increases, the translational and rotational temperatures approach each other, and that for a large value of the ratio, both of the temperatures are similar to the equilibrium temperature. Author

N84-30120# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
VISUALIZATION FOR A FREE JET BY A LASER INDUCED FLUORESCENCE METHOD AND ITS STRUCTURE c34
Koji Teshima *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 51-60 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

Visualized free jets by an I2-Ar ion-laser induced fluorescence (LIF) method are shown and their features are explained qualitatively in connection with the flow properties of the flow medium and of the seeded I2. The LIF represents the jet structure very well except for helium jets. It is shown that striped patterns of LIF in the supersonic region of the jet result from the Doppler shift of the rovibronic absorption lines of I2 due to the flow velocity component in the direction of the laser beam and that the flow velocity can be determined from the observed inclination of the strips. It is also shown that the intensity of the LIF depends strongly on the rotational temperature of I2. Author

N84-30121# Miyazaki Univ. (Japan). Dept. of Applied Physics.
REMARKS ON THERMAL ANALYSES OF THIN 4He FILMS IN SUPERFLUID HEAT PIPE c34
Kanji Etori *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 61-68 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

The heat-conduction equation on the thin films of superfluid is discussed with respect to entropy flows of the vapor and the thin film in heat pipe. Taking the approximation of the heat-conduction equation, it is shown that the thermal analyses based on the conventional theories depend only on the stationary state in thermal equilibrium. As a result, it is suggested tha some terms which include the entropy depending on temperature and the transient heat flow should be counted to contain the exact estimation on the output power of the heat flow in superfluid heat pipe. Author

N84-30122# Osaka Univ. (Japan). Dept. of Aeronautical Engineering.
A BLOWUP PHENOMENON OF THE WORKING FLUID IN A TWO-PHASE CLOSED THERMOSYPHON c34
Kanji Negishi *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 69-74 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

A periodic blowup phenomenon of the working fluid is often observed in a two phase closed thermosyphon at rather low heat load operation. The phenomenon is a blowing movement of a large amount of the liquid from the evaporator to the condenser by an explosive expansion and development of a boiling bubble in the liquid pool. The fluctuating temperature distributions on the container wall of the thermosyphon are reasonably explained when compared with the visual observation of the movement of the working fluid. Author

N84-30123# Tokyo National Technical Coll. (Japan). Dept. of Mechanical Engineering.
AN EXPERIMENTAL STUDY OF HELICAL GUIDE-TYPE ROTATING HEAT PIPE c34
Akihiro Shimizu and Shinichiro Yamazaki *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 75-82 (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

Thrust force in the direction of the evaporator by helical coil installed of the inner wall of the container is used to return the condensate back to the evaporator. Three heat pipes made with copper containers were designed and tested. Flowing fluid visualization, degree of vacuum, heat transfer efficiency, equivalent thermal conductivity, and quality of the working fluid are discussed for each of the heat pipes. A.R.H.

N84-30124# Suzuki Metal Industry Co. Ltd. (Japan).
THE HEAT PIPE EXCHANGER WITH CONTROLLABLE HEAT EXCHANGING AREA c34
Mitsuo Oshiro, Shigetoshi Takasu, Masao Kurihara, Kozo Taneda, Takashi Nakamoto, and Hitoshi Nakayama *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 83-92 (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

The heat transfer rate through the heat exchanger in an industrial boiler that burns heavy oils must be controlled so as not to decrease the exhaust gas temperature below the dew point of sulfuric acid. Two systems of heat pipe exchangers are examined: one controls the heat exchange area of the condenser section of the heat pipes and the other uses the variable conductance heat pipes. The characteristics of these two systems are described. The temperatures at various points and the gas quantity are plotted against the boiler loads. The maintainability and operational reliability of both systems are demonstrated. A.R.H.

N84-30125# Suzuki Metal Industry Co. Ltd. (Japan).
EXPERIMENTAL STUDY OF THE NAPHTALINE HEAT PIPE c34
I. Honda, A. Suzuki, Y. Abe, and S. Sugihara *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 93-100 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

Industrial needs for heat pipes which are operable at medium and high temperature ranges over 200 C are increasing in order to recover waste heat from high temperature furnaces or to cool aluminum diecasting molds. Naphthaline is attractive working fluid due to its cost and easiness of handling for medium temperature range. In the heat transfer characteristics, the fabrication method and also the life test result of the heat pipes using naphtaline as the working fluid are reported. Author

N84-30126# Fujikura Ltd., Sakura (Japan).
RESEARCH AND DEVELOPMENT OF LONG HEAT PIPES AND THEIR APPLICATIONS c34
M. Takaoka, T. Mohtai, M. Mochizuki, and K. Mashiko *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 101-106 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

A 40 m thermosyphon type flexible corrugated heat pipe was constructed and its heat transfer characteristics were measured. The flooding phenomenon was quantitatively observed using electronic stethoscopes, and its influence to the heat transfer characteristics was determined. The particular features of the road heating system using long heat pipes are: (1) there is no possibility of water leaking and their maintenance is easy; (2) they endure heavy loads, thermal stresses, vibrations and ground subsidence; (3) the heat transfering surface area of the heat pipes is so large that it is particularly effective for heating through small temperature difference; and (4) the installation is easy and inexpensive. A.R.H.

N84-30127# Chuby Electric Power Co. (Japan).
STUDY OF LATENT HEAT STORAGE SYSTEM USED HEAT PIPES FOR COOLING OF UNDERGROUND CABLES c34
H. Takagi, T. Mohtai (Fujikura Ltd.), and K. Kojima (Fujikura Ltd.) *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 107-111 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

An experimental 13 kWh thermal storage tank of polyethylene glycol using 36 heat pipes was constructed. Performance characteristics with cold and hot water supplies are examined. Author

N84-30128# IIT Research Inst., Chicago, Ill.
SIMULATION OF POWDER DISTRIBUTION IN IITRI BAG EXPERIMENTS
D. Gidaspow and M. Syamlal 1 Mar. 1984 42 p
(Contract DAAK70-81-C-0175)
(AD-A141941; AD-E800940) Avail: NTIS HC A03/MF A01 CSCL 09/2

A two-dimensional transient computer program developed for fluidization was used to study the uniformity of powders injected into rectangular cavities. Most configurations gave very non-uniform powder distributions. Simulation of a leak present in the experimental bag experiments produced a jet expansion not unlike that observed in photographic records. Simulations with 5, 30 and 200 micron powders showed that the jet expansion was most pronounced with 5-micron powders, and that the powder distribution was the most uniform of the configurations studied. A comparison of experimental concentration contours obtained from the high-speed photographic records of powder injection showed a reasonably good agreement with the theory. The agreement is considered good, because the theory has no fitted parameters. It is predictive. Discrepancies between the theoretical and experimental results may be qualitatively accounted for by bag expansion and a reduced pressure in the bag due to leaks. Author (GRA)

N84-30129# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
PRECISION FLEXIBLE MACHINING CELLS WITHIN A MANUFACTURING SYSTEM Interim Report
M. R. Cutkosky, P. S. Fussell, and R. Milligan, Jr. Jun. 1984 49 p
(AD-A142527; CMU-RI-TR-84-12) Avail: NTIS HC A03/MF A01 CSCL 13/9

The conceptual design of a manufacturing cell for a small-batch manufacturer is discussed in this report. The cell produces small parts with dimensional tolerances of + or .005 inch (.13mm) using a minimum of machining equipment. The cell design emphasizes near-term technology and uses off the shelf items where possible. The proposed cell can run unattended for a moderate period of time (e.g., over-night). The design philosophy is to treat the cell components and control programs as discrete modules in a hierarchy. The resulting cell is easily integrated into a larger system. It is readily modified or expanded as more sophisticated equipment and techniques become available. GRA

N84-30130# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.
MEASUREMENTS OF DISSOLVED GASES AT CORPS OF ENGINEERS PROJECTS Final Report
S. C. Wilhelms Jun. 1984 30 p
(AD-A142727; WES/TR/HL-E-84-6) Avail: NTIS HC A03/MF A01 CSCL 13/2

Instruments to measure dissolved gases were tested and evaluated under field conditions. Limitations and potential problems with the various instruments were discussed and recommendations were made. For dissolved oxygen (DO) measurements, instruments that use polarographic probes were recommended. Chemical titration techniques were recommended for probe calibration and spot-checking polarographic probe readings. The D'Aoust Tensionometer and WES Saturometer were recommended for measurements to determine dissolved nitrogen (DN) concentrations. These techniques were recommended because they proved easy to use and were reasonably reliable under field conditions. Although it provided simultaneous determinations of DO and DN, gas chromatography was not recommended for field measurements. The instruments were too sensitive to field handling, and results were very operator dependent. GRA

N84-30131# Kelvinator Compressor Co., Grand Rapids, Mich.
RESEARCH AND DEVELOPMENT OF ENERGY-EFFICIENT HIGH BACK-PRESSURE COMPRESSOR
Sep. 1983 93 p refs
(Contract DE-AC05-84OR-21400)
(DE84-011827; ORNL/Sub-78-7229/5) Avail: NTIS HC A05/MF A01

Improved-efficiency compressors were developed in four capacity sizes. Changes to the baseline compressor were made to the motors, valve plates, and mufflers. The adoption of a slower running speed compressor required larger displacements to maintain the desired capacity. This involved both bore and stroke modifications. All changes that were made to the compressor are readily adaptable to manufacture. Prototype compressors were built and tested. The largest capacity size (4000 Btu/h) was selected for testing in a vending machine. Additional testing was performed on the prototype compressors in order to rate them on an alternate refrigerant. A market analysis was performed to determine the potential acceptance of the improved-efficiency machines by a vending machine manufacturer, who supplies a retail sales system of a major soft drink company. DOE

N84-30132# California Univ., Livermore. Lawrence Livermore Lab.
DYNAMIC POWDER COMPACTION
Mark L. Wilkins 22 Dec. 1983 8 p Presented at the 8th Intern. Conf. on High Energy Rate Fabrication, San Antonio, 17-21 Jun. 1984
(Contract W-7405-eng-48)
(DE84-006133; UCRL-90142; CONF-840653-3) Avail: NTIS HC A02/MF A01

The advantages of powder consolidation by dynamic compaction are discussed. With this technique, materials can be fabricated that cannot be made by any other means. Computer simulations are effective in guiding an experimental program for optimizing the process. Examples are shown for the consolidation of powders of a metallic glass and the ceramic aluminum nitride. DOE

N84-30133# Varigas Research, Inc., Timonium, Md.
COMPRESSED AIR SYSTEMS: A GUIDEBOOK ON ENERGY AND COST SAVINGS
30 Mar. 1984 194 p

(Contract DE-AC03-81CS-40520)
(DE84-008802; DOE/CS-40520/T2) Avail: NTIS HC A09/MF A01

This guidebook shows how energy can be saved in compressed air systems. Basic compressed air systems which are typical of those found in industry and the engineering practices behind them are described. Energy conservation recommendations cover equipment selection, design, maintenance, and operation. Information for making economic evaluations of various engineering and equipment alternatives as they affect operations and costs are included. The appendices include some modern computer based approaches to predicting pressure drop for designing compressed air distribution systems. A bibliography which provides leads for further and more detailed technical information on these and related subjects is also included. DOE

N84-30134# Sheffield Univ. (England). Dept. of Control Engineering.
CONTROL SYSTEMS DESIGN FOR LINEAR DYNAMIC SYSTEMS USING SIMPLE MODELS: SOME CASE STUDIES. PART 1: THE SINGLE-INPUT/SINGLE-OUTPUT CASE
A. Chotai and D. H. Owens Nov. 1983 86 p refs
(Contract SERC-GR/B/23250)
(RR-247-Pt-1) Avail: NTIS HC A05/MF A01

Controller design for an unknown plant using simple models so that the closed loop stability, asymptotic tracking of step input occurs is considered. Using first and second order differential-delay plant models, a highly satisfactory design can be achieved for most monotonic and for large numbers of non-monotonic stable plants. The predicted stability region is a substantial part of the actual stability region and frequently includes Ziegler-Nichols tuning points and standard closed-loop damping conditions. Time domain methods permit higher gains to be used than frequency domain methods. For a differential-delay model, the Smith predictor scheme is better than a standard feedback scheme. Author (ESA)

N84-30135# Ohio Univ., Athens. Dept. of Electrical and Computer Engineering.
MICROPROCESSOR AUTOMATION FOR THE DYNAFLECT DEFLECTION MEASURING SYSTEM Final Report
Michael J. Potts and James C. Gilfert Aug. 1983 129 p Sponsored in part by the Ohio DOT and FHWA
(PB84-180413; FHWA/OH-83/002) Avail: NTIS HC A07/MF A01 CSCL 13B

The Dynaflect Deflection Measurement System is used for the evaluation of pavement systems. However, its basic mode of operation is inefficient in data handling because the data must be manually transcribed twice before entering the computer for processing and storage. An automated version of the Dynaflect System which employs microprocessor automation to free human operators from the majority of time consuming and error prone operations both in the field and in the office is described. A microprocessor based controller is used in the data collection phase to lower and raise the sensors, gather data from the Dynaflect and its associated distance measuring instrument, test these data for validity, and record them to a removable semipermanent memory. The controller also has provision for entry of a header record which defines all conditions of the data collection. A microprocessor based reader is used in the office to dump the collected data directly from the memory board into the computer. GRA

N84-30136# Earthquake Engineering Research Inst., Berkeley, Calif.
DESIGN CONSIDERATIONS FOR SHEAR LINKS IN ECCENTRICALLY BRACED FRAMES
J. O. Malley and E. P. Popov Nov. 1983 139 p refs
(Grant NSF CEE-81-07217)
(PB84-192186; UCB/EERC-83/24; NSF/CEE-83037) Avail: NTIS HC A07/MF A01 CSCL 13M

The performance of an eccentrically braced frame depends to a great extent on the behavior of short beam segments called active links which, through bending and shear, transfer the axial forces in the diagonal braces to other braces or to columns. The sensitivity of link behavior to the imposed loading history, the link column connection detail, and the web stiffener design and details are discussed. The results of twelve full size shear link specimens are presented. Each of the specimens was designed to investigate specific shear link response characteristics. Four specimens were tested with stiffener details which differed significantly from those of previous experiments and early design applications. Another set of four specimens was designed and tested with widely varying loading histories. A set of four specimens which employed conventional moment resisting connection details was also tested. Test conclusions and design recommendations generated by the test results are presented. A practical method for web stiffener design is developed. GRA

N84-30137# Earthquake Engineering Research Inst., Berkeley, Calif.
HYBRID MODELING OF SOIL-STRUCTURE INTERACTION IN LAYERED MEDIA
T. J. Tzong and J. Penzien Oct. 1983 156 p refs
(Grant NSF CEE-81-05790)
(PB84-192178; UCB/EERC-83/22; NSF/CEE-83035) Avail: NTIS HC A08/MF A01 CSCL 13M

The hybrid modeling approach, which effectively solves soil-structure interaction problems, is extended for use in layered soil media. This approach partitions the entire structure-soil system into a near field which consists of the structure and a portion of its surrounding soil, modeled by the finite element method, and a far field which is responsible for energy travelling away from the near field represented by an impedance model. Two analytical methods, appropriate to different layered soil systems, are employed to simulate the semi-infinite far-field region. The system identification method, which determines the approximate far-field impedance functions along the interface between the near and far fields, is applied to the single-layered half-space in which a rigorous representation of the far-field is difficult to obtain by direct solution. A boundary solution method is developed to calculate the exact far-field impedance matrix for cases involving layers of soil having a rigid lower boundary. GRA

N84-30138# Advanced Mechanical Technology, Inc., Newton, Mass.
INTEGRATED GAS-FIRED SPACE HEATING/WATER HEATING SYSTEM WITH ELECTRIC AIR CONDITIONING Annual Report, Jan. - Dec. 1983
Andrew D. Vasilakis, George M. Celorier, and Joseph Gerstmann Jan. 1984 92 p refs Sponsored by Gas Research Inst.
(PB84-181999; GRI-84/0036) Avail: NTIS HC A05/MF A01 CSCL 13A

The marketability of a gas space and water heating system combined with an electric air-conditioning system was examined. This included a cost effectiveness evaluation when compared to competing systems. The concept appears feasible using a three-year payback criteria. An engineering prototype was constructed which demonstrated space heating efficiencies in the high eighties and water heating recovery efficiencies in the low to mid eighties. GRA

N84-30139# National Bureau of Standards, Washington, D.C. Center for Building Technology.
DIRECTIONAL EXTREME WIND SPEED DATA FOR THE DESIGN OF BUILDINGS AND OTHER STRUCTURES Final Report
Michael J. Changery (National Climatic Center), Eugene J. Dmitriu-Valcea, and Emil Simiu Mar. 1984 127 p refs
(PB84-178847; NBS-BSS-160; LC-84-601008) Avail: NTIS HC A07/MF A01 CSCL 13M

The purpose is to provide largest yearly fastest-mile wind speed data corresponding to winds blowing from each octant at 37 airport stations in the United States. Four sets of data are presented. The first set consists of largest yearly fastest-mile wind speeds at 24 stations as extracted from original records. The second set consists of largest yearly fastest-mile wind speeds at 13 stations as extracted from Local Climatological Data (LCD) summaries. The third and fourth sets consist of the data from the first and second sets reduced to a height of 10 m above ground. Information on possible differences between extreme data extracted from original records on the one hand and from LCD summaries on the other hand is given. Procedures for estimating extreme wind effects that take into account the directional characteristics of the extreme wind climate and of the aerodynamic behavior of the structure are briefly reviewed, and it is noted that additional research on sampling errors in the estimation of extreme wind effects appears to be warranted. Author (GRA)

N84-30140# California Inst. of Tech., Pasadena. Jet Propulsion Center.
NATURAL CONVECTION FLOWS AND ASSOCIATED HEAT TRANSFER PROCESSES IN ROOM FIRES Ph.D. Thesis
W. S. Sargent 1983 524 p refs
(Contract NB82-NADA-3033)
(PB84-171172; NBS-GCR-83-447) Avail: NTIS HC A22/MF A01 CSCL 13M

The results of experimental investigations of natural convection flows and associated heat transfer processes produced by small fires in rooms with a single door or window opening are given. Calculation procedures was developed to model the major aspects of these flows. Two distinct sets of experiments were undertaken. First, in a roughly 1/4 scale facility, a slightly dense solution of brine was allowed to flow into a tank of fresh water. The resulting density difference produced a flow which simulated a very small fire in a room with adiabatic walls. Second, in an approximately 1/2 scale test room, a nearly stoichiometric mixture of air and natural gas was burned at floor level to model moderate strength fires. In this later facility, the heat conducted through the walls was directly measured. The gas temperature and composition throughout the room was determined. Author (GRA)

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N84-30141 British Broadcasting Corp., London (England). Research Dept.
FILTERING OF THE COLOUR-DIFFERENCE SIGNALS IN 4:2:2 YUV DIGITAL VIDEO CODING SYSTEMS
V. G. Devereux Jun. 1984 17 p refs
(BBC-RD-1984/4) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

Specifications are proposed for the characteristics of the low-pass filters required at the input and output of the U and V channels of a 4:2:2 YUV digital video coding system. In such a system, the Y (luminance) signal is sampled at 13.5 MHz and the U and V (color-difference) signals are sampled at 6.75 MHz. It was concluded on both theoretical and practical grounds that these characteristics should be skew-symmetrical about a point of 6 dB attenuation at 3.375 MHz and that they should have a pass-band extending to about 2.6 MHz. It is shown that the use of a skew-symmetric response reduces the cost and complexity of digital filtering to about one quarter of that required for a non-skew-symmetric response with a similar pass-band and rate of cut-off. Tests are described concerning the subjective effect of the proposed characteristics on displays of very critical test signals. Author

N84-30142 British Broadcasting Corp., Kingswood (England). Engineering Div.
THE PRESENT STATUS OF CLEAN PAL SYSTEMS
J. O. Drewery Jul. 1984 15 p refs
(BBC-RD-1984/6) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

The various approaches to realizing a Clean PAL color television system, which luminance and chrominance interact minimally, are reviewed. Attention is focused on the Weston Clean PAL system which offers the possibility of simultaneous luminance and chrominance transmission while retaining the optimum spectral distribution for each. Starting with the original proposal, based on single line delay filters, it is shown how the system can be refined using more complex filters or enhanced, using an auxiliary signal to carry the lost information. The relationship with MAC was also discussed. It is shown that, using the most complex filters, a vertical chrominance performance superior to MAC is obtainable. Author

N84-30143 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
ELASTIC BUFFERS FOR DIGITAL RINGS
P. T. Neale Jan. 1984 17 p refs
(NPL-DITC-38/84; ISSN-0262-5369) Copyright. Avail: Issuing Activity

An elastic buffer to achieve end-to-end transmission synchronization of digital communication rings is proposed. The buffer must function as a first in first out (FIFO) store, though this does not necessarily mean that a standard FIFO chip should be used. When the ring is initialized, the buffer occupancy must be set up to give optimum accommodation. The buffer must be adequately sized to deal with worst-case timing conditions. However implemented, the control logic of the elastic buffer must include at least one synchronizer circuit and this must be arranged so that the probability of the output becoming anomalous is acceptably low. Variable packet-sizing makes for a relatively easy design of elastic buffer, while fixed sizing requires an additional synchronizer circuit and more buffer capacity, if an integral number of packets is to be circulated. Author (ESA)

N84-30144 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).
BACKSCATTER MEASUREMENTS ON SNOW COVERED TERRAIN AT 94 GHz
E. P. Baars and H. Essen Apr. 1984 21 p refs
(Contract BMVg-FOA-T/RF31/81005/82302)
(Rept-4-84; Lfd-223) Copyright. Avail: Issuing Activity

Backscatter measurements on snow covered terrain were performed with a 94 GHz experimental radar. The measurement area was scanned by a periscope antenna over an azimuthal range of 45 deg in elevation steps of 0.7 deg, corresponding to the half power beam-width of the antenna. Values for the radar reflectivity were extracted at depression angles ranging from 15 to 55 deg for LC/LC and LC/RC transmit/receive polarization. During the measurements an environmental characterization emphasizing snow features was performed. Data evaluation shows the strong dependence of the radar reflectivity on the liquid water content of the snow. Author (ESA)

N84-30145*# Illinois Univ., Urbana-Champaign. Electromagnetics Lab.
WAVE ATTENUATION AND MODE DISPERSION IN A WAVEGUIDE COATED WITH LOSSY DIELECTRIC MATERIAL
C. S. Lee, S. L. Chuang, S. W. Lee, and Y. T. Lo Jul. 1984 65 p refs
(Grant NAG3-475)
(NASA-CR-173820; NAS 1.26:173820; EL-TR-84-13; UILU-ENG-84-2552) Avail: NTIS HC A04/MF A01 CSCL 20N

The modal attenuation constants in a cylindrical waveguide coated with a lossy dielectric material are studied as functions of frequency, dielectric constant, and thickness of the dielectric layer. A dielectric material best suited for a large attenuation is suggested. Using Kirchhoff's approximation, the field attenuation in a coated waveguide which is illuminated by a normally incident plane wave is also studied. For a circular guide which has a diameter of two wavelengths and is coated with a thin lossy dielectric layer (omega sub r = 9.1 - j2.3, thickness = 3% of the radius), a 3 dB attenuation is achieved within 16 diameters. M.G.

N84-30146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SPECTRUM/ORBIT UTILIZATION PROGRAM FOR GEOSTATIONARY SATELLITES

Edward F. Miller 1984 14 p refs Presented at the Mil. Commun. Conf. (MILCOM), Los Angeles, 21-24 Oct. 1984; sponsored by the Inst. of Electrical and Electronics Engineers
(NASA-TM-83759; E-2247; NAS 1.15:83759) Avail: NTIS HC A02/MF A01 CSCL 17B

Mutual interferences among geostationary satellite communication systems determine the permitted spacing between satellites and the limits on the capacity of the orbit/spectrum resources available. This paper describes the computer program for analyzing the mutual interferences among communication satellite systems. Capabilities of the program are described. Inputs, models used, program operations, and program outputs are given. To show application of the program, an example scenario is analyzed for fixed satellites providing domestic service to North America. Author

N84-30147*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

MMIC TECHNOLOGY FOR ADVANCED SPACE COMMUNICATIONS SYSTEMS

A. N. Downey, D. J. Connolly, and G. Anzic 1984 9 p refs Proposed for presentation at the 17th Ann. Electron. and Aerospace Conf. (EASCON), Washington, D.C., 10-12 Sep. 1984; sponsored by the Inst. of Electrical and Electronics Engineers
(NASA-TM-83749; E-2236; NAS 1.15:83749) Avail: NTIS HC A02/MF A01 CSCL 17B

The current NASA program for 20 and 30 GHz monolithic microwave integrated circuit (MMIC) technology is reviewed. The advantages of MMIC are discussed. Millimeter wavelength MMIC applications and technology for communications systems are discussed. Passive and active MMIC compatible components for millimeter wavelength applications are investigated. The cost of a millimeter wavelength MMIC's is projected. Author

N84-30148# Kansas Univ., Lawrence. Remote Sensing Lab.

NORDSEE RADAR BACKSCATTER MEASUREMENTS DATA REPORT Technical Report, 20 Jan. - 3 Feb. 1984

S. Gogineni, A. H. Chaudhry, and R. K. Moore Mar. 1984 46 p
(Contract N00014-79-C-0533)
(AD-A141914; CRINC/RSL-TR-419-2) Avail: NTIS HC A03/MF A01 CSCL 17/9

Radar backscatter measurements of the ocean were made by University of Kansas (KU) investigators from the Nordsee tower to determine scattering coefficients as a function of wind speed, incidence angle and look direction at C-, X- and Ku-bands and to determine the modulation of Bragg-resonant ripples by long waves. A modified version of the KU helicopter-borne scatterometer (HELOSCAT) was used to acquire the data. The radar backscatter data were collected at selected frequencies between 4 and 17 GHz, and incidence angles between 18 deg. and 70 deg. with VV- and HH-polarizations. GRA

N84-30149# Naval Research Lab., Washington, D. C.

A HIGH-RESOLUTION TARGET-TRACKING CONCEPT USING SPECTRAL ESTIMATION TECHNIQUES Interim Report

W. F. Gabriel 31 May 1984 54 p
(RR0-2105; WR0-2101)
(AD-A141921; NRL-8797) Avail: NTIS HC A04/MF A01 CSCL 17/9

A target-tracking concept based on modern spectral estimation techniques combined with adaptive array processing has been investigated to attain superresolution tracking performance. The goal is to achieve satisfactory monopulse track angle estimates in the presence of strong multiple interference sources which are located within a beamwidth of the target. This application area was addressed via an all-digital receive system concept whereby adaptive spatial filter weights are periodically updated on the basis of source estimates, and the filter output residue signals are then sifted for targets. This report includes several radar-simulation examples tc illustrate some of the processing step outputs, tracking beam distortions, corrections for target wavefront distortions, and tracking in the presence of closely spaced interference sources. It also contains a section devoted to the algorithm theory, analysis, and development which will help to understand the various processing steps involved. Author (GRA)

N84-30150# Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.

A PROCEDURE FOR DESIGNING EXACT RECONSTRUCTION FILTER BANKS FOR TREE-STRUCTURED SUBBAND CODERS

M. J. T. Smith and T. P. Barnwell, III 1984 5 p To be presented at the International Conference, Acoustics, Speech, and Signal Processing, 1984
(Contract DAAG29-81-K-0024; AF Proj. 2304)
(AD-A142345; AFOSR-84-0335TR) Avail: NTIS HC A02/MF A01 CSCL 17/2

In recent years, tree-structured analysis/reconstruction systems have been extensively studied for use in subband coders for speech. In such systems, it is important that the individual channel signals be decimated in such a way that the number of samples coded and transmitted does not exceed the number of samples in the original speech signal. Under this constraint, the systems presented in the past have sought to remove the overall analysis/reconstruction distortion. In this paper, it is shown that it is possible to design tree-structured analysis/reconstruction systems which meet the sampling rate condition and which also result in exact reconstruction of the input signal. This paper develops the conditions for exact reconstruction and presents a general method for designing the corresponding high quality analysis and reconstruction filters. Author (GRA)

N84-30151# Lockheed Missiles and Space Co., Palo Alto, Calif.

STRATEGIC BLUE-GREEN COMMUNICATION FILTERS Final Report

W. J. Rosenberg Apr. 1984 33 p
(Contract N00014-78-C-0526)
(AD-A142353; LMSC-D913930) Avail: NTIS HC A03/MF A01 CSCL 17/2

The project began as an effort to construct narrowband, wide-field-of-view, large-aperture, plastic, birefringent filters suitable for blue-green communications. During the course of the study we investigated the use of crystalline materials in addition to plastic films, and we studied filter design theory in order to find designs more suitable to the blue-green system requirements. In addition, we constructed a quartz, 2A filter for the 1981 SLCAIR experiment. In this report we have included an introduction to the principles of narrowband, wide-field-of-view, birefringent filters. This section is included since the subject matter is not readily available except piecemeal in technical journals. Section 3 is a discussion of the materials which were considered during this study. It contains subsections devoted to crystals, plastics and analog element, respectively. A class of new lossless filter designs is described in Section 4. These designs are expected to provide a basis for high-transmission filters in the future. The operational SLCAIR-81 filter is described in Section 5. It was part of the successful experiment which demonstrated communication to the USN Dolphin, a research submarine. Finally, in Section 6 we describe the non-vignetting filter design which was discovered during this study. It represents a significant throughput advantage for crystal filters used in non-imaging applications. GRA

N84-30152# Naval Research Lab., Washington, D. C.

A COMPUTER MODEL FOR A MULTIPLE HIGH PRF PULSE DOPPLER RADAR

K. Gerlach and T. B. Mitchell 7 Jun. 1984 26 p
(AD-A142357; NRL-MR-5332) Avail: NTIS HC A03/MF A01 CSCL 17/9

A computer model which simulates a Multiple High PRF Pulse Doppler radar has been developed. The model has the capability of computing the system parameters for Post Detection Processing necessary to achieve given desired probabilities of detection and false alarm. A variety of parameters such as range resolution,

number of PRF bursts, number of Doppler bins, and Swerling model are inputted. Output measures of effectiveness include the required signal-to-noise power ratio per pulse burst, average number of arithmetic operations, and ghosting probabilities.
Author (GRA)

N84-30153# Naval Research Lab., Washington, D. C. Communications Systems Engineering Branch.
LIST METRIC DETECTION OF CODED FH/MFSK (FREQUENCY-HOPPED MULTIPLE FREQUENCY SHIFT KEYING) IN A TONE JAMMING ENVIRONMENT Final Report, Oct. 1982 - Sep. 1983
P. J. Crepeau 6 Jun. 1984 25 p
(AD-A142358; NRL-MR-5356) Avail: NTIS HC A02/MF A01 CSCL 17/4

The performance of coded FH/MFSK with list metric detection is presented for two severe jamming channels, the single-tone and multiple-tone jamming channels. It is shown that list detection is a highly efficient soft decision quantization scheme for tone jamming provided that channel state information in the form of list position probabilities is available. Results indicate an improvements in Eb/No performance of greater than 10 dB over hard decision performance when large alphabets and large list sizes are used. Optical jamming fractions are derived, and in all cases the optimal jamming is less than full-band. Author (GRA)

N84-30154# Mitre Corp., Bedford, Mass.
RANGE CORRECTIONS FOR AIRBORNE RADAR - A JOINT STARS STUDY Final Report
G. A. Robertshaw May 1984 56 p
(Contract F19628-82-C-0001)
(AD-A142363; MTR-9055; ESD-TR-84-169) Avail: NTIS HC A04/MF A01 CSCL 17/9

To provide accurate estimates of true target range, all airborne surveillance radars must take into account the effects of the atmospheric medium. The principal contribution to the range correction for atmospheric refractivity arises from the retardation of the propagation speed of the sensing field. Changes in atmospheric density, layer structure, and/or water vapor content, associated with geographical or weather factors, affect the magnitude of the range correction. In the present work, based primarily on USAFETAC ray trace computations performed in support of Joint STARS, range correction variability is examined using atmospheric data collected over three-month periods at Munich and Hannover in Germany, Dhahran in Saudi Arabia, and Pohang in South Korea. Range correction statistics are presented for each location, the predictive value of surface refractivity measurements is assessed, and a simple empirical formula for range correction is developed. Author (GRA)

N84-30155# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DECENTRALIZED ESTIMATION IN COMMUNICATION NETWORKS WITH DELAY M.S. Thesis
A. Oezbek Jan. 1984 117 p
(Contract N00014-77-C-0532)
(AD-A142376; LIDS-TH-1353) Avail: NTIS HC A06/MF A01 CSCL 17/2

Previous work on decentralized estimation has assumed unlimited capacity on the communication channels between the sensors and the estimators. In practice, this is not possible; increased traffic rate leads to network congestion and decreased performance. This thesis develops optimum reporting schedules for sensors, routing schemes for messages and data fusion algorithms for intermediate nodes. Author (GRA)

N84-30156# Coast Guard Research and Development Center, Groton, Conn.
EVALUATION OF U.S. COAST GUARD FORWARD-LOOKING AIRBORNE RADARS Final Report, Feb. 1983 - Feb. 1984
H. G. Ketchen, J. St.Martin, G. L. Hover, and T. J. Mazour Mar. 1984 86 p
(AD-A142417; USCG-D-17-84) Avail: NTIS HC A05/MF A01 CSCL 17/9

During CY 1983, the U.S. Coast Guard R&D Center conducted field experiments off Fort Pierce, FL and Oregon Inlet, NC to evaluate the small-target detection capabilities of three forward-looking airborne radars (FLARs): the AN/APS-127, the AN/APS-133, and the AN/APN-215. Field data from these experiments and from a West German field test of the AN/APN-134 FLAR were compared to each other and to theoretical detection range predictions promulgated by NADC. These data were used to analyze the potential of each system to fulfill the Coast Guard Search and Rescue (SAR) and Enforcement of Laws and Treaties (ELT) missions. Targets of 1-square meter and 100-square meter radar cross sections were considered in the analysis. The AN/APS-134 was found to be clearly superior to the other three candidate FLAR systems in its capability to fulfill SAR and ELT mission requirements. In sea states 3 and above, the AN/APS-134 is the only FLAR among those evaluated with any significant ability to detect 1-square meter targets. Recommendations are made for conducting FLAR search operations and for future research and development efforts. Author (GRA)

N84-30157# Illinois Univ., Urbana. Coordinated Science Lab.
THE MISSING CONE PROBLEM IN COMPUTER TOMOGRAPHY AND A MODEL FOR INTERPOLATION IN SYNTHETIC APERTURE RADAR Ph.D. Thesis
D. A. Hayner Jul. 1983 165 p
(Contract N00014-79-C-0424)
(AD-A142421; R-989; UILU-ENG-83-2210) Avail: NTIS HC A08/MF A01 CSCL 17/9

The first part of this thesis considers the missing cone problem in computer tomography. In this problem, an incomplete set of projection data is available from which an image must be reconstructed. The object of the algorithms presented in this thesis is to reconstruct a higher quality image than that obtainable by treating the projections as the only source of information concerning the image to be generated. This is accomplished by treating the problem in terms of spectral extrapolation. With this interpretation, various assumptions concerning the image and other forms of a priori information can be included in the data set to increase the total information available. In order to understand the subtleties of these enhancement algorithms, the spectral extrapolation techniques exployed must be well understood. A result of studying the Gerchberg and Papoulis extrapolation techniques is that either can be characterized as a contraction mapping for any realizable discrete implementation. Furthermore, it is theoretically derived and experimentally verified that these algorithms will in general obtain an optimal solution prior to converging to the unique fixed point.
GRA

N84-30158# Illinois Univ., Urbana. Coordinated Science Lab.
PERFORMANCE OF DIGITAL COMMUNICATIONS OVER SELECTIVE FADING CHANNELS Ph.D. Thesis
F. D. Garber Sep. 1983 157 p
(Contract N00014-79-C-0424)
(AD-A142427; R-998; UILU-ENG-83-2219) Avail: NTIS HC A08/MF A01 CSCL 17/2

The performance of digital communications over selective wide-sense-stationary uncorrelated-scattering (WSSUS) fading channels is investigated. The emphasis is on the evaluation of the performance of binary differential phase-shift keyed (DPSK) and binary frequency-shift keyed (FSK) communications with primary emphasis on the effects of intersymbol interference produced by the frequency-selective character of WSSUS fading channels. The error probabilities of DPSK and FSK are evaluated for several models of WSSUS frequency-selective fading channels. The analysis is focused on the performance evaluation for Rayleigh fading channels. The expression for the probability of error for these systems are formulated in a way that allows the identification of the key parameters of the communication system. The performance of DPSK and FSK are evaluated for several signaling formats. The design parameters considered are the shapes of the basic data-pulse waveforms for both DPSK and FSK, the modulation index, and the relative phase between successive transmitted signals for FSK. It is shown that the system error probability is highly dependent on these system parameters. GRA

N84-30159# Megapulse, Inc., Bedford, Mass.
AN EXPERIMENTAL INVESTIGATION OF THE IMPROVEMENT IN THE RECEPTION OF TM (TRANSVERSE MAGNETIC)-POLARIZED LF (LOW-FREQUENCY) WAVES WITH A TWO-ELEMENT SPACED ARRAY Interim Report
F. M. Tingley and R. C. Kahler Griffiss AFB, N.Y. RADC May 1984 52 p
(Contract F19628-80-C-0146)
(AD-A142478; RADC-TR-84-91) Avail: NTIS HC A04/MF A01 CSCL 17/2

For this study, a 2-element spaced array antenna system was developed and tested. This array consisted of two well-spaced vertical loops combined with a microwave link. The array was tested to show improvements in signal-to-noise ratio over omnidirectional antennas, using received transmissions from an aircraft towing a long wire antenna. Gains in signal-to-noise ratio of up to 12.8 dB were demonstrated. Author (GRA)

N84-30160# Naval Postgraduate School, Monterey, Calif.
EFFECTS OF EMOTIONAL AND PERCEPTUAL-MOTOR STRESS ON A VOICE RECOGNITION SYSTEM'S ACCURACY: AN APPLIED INVESTIGATION
G. K. Poock and B. J. Martin Feb. 1984 76 p
(AD-A142554; NPS55-84-002) Avail: NTIS HC A05/MF A01 CSCL 05/10

This was an applied investigation examining the ability of a speech recognition system to recognize speakers' inputs when the speakers were under different stress levels. Subjects were asked to speak to a voice recognition system under three conditions: (1) normal office environment, (2) emotional stress, and (3) perceptual-motor stress. Results indicate a definite relationship between voice recognition system performance and the type of low stress reference patterns used to achieve recognition. Author (GRA)

N84-30161# Sandia Labs., Albuquerque, N. Mex.
ACOUSTICAL COMMUNICATIONS BY MEANS OF SMALL EXPLOSIVE CHARGES
T. S. Edrington Mar. 1984 11 p refs
(DE84-008903; SAND-83-1652) Avail: NTIS HC A02/MF A01

An acoustical communication system that conveys information by modulating the time intervals between detonations of small (subgram) explosive charges was designed and field-tested. In addition to an information capacity of about 20 bits per charge, the system provides a means for making inferences about sound speed and attenuation in the propagation medium. DOE

N84-30162# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER-GENERATED MOVIE ON THE SHORT PULSE ELECTROMAGNETIC BEHAVIOR OF WIRE OBJECTS
E. K. Miller and C. G. Dease May 1984 23 p refs
(Contract W-7405-eng-48)
(DE84-012032; UCID-20075) Avail: NTIS HC A02/MF A01

The results shown in this movie were obtained using the Thin-Wire Time Domain (TWTD) code. This code is based on a thin-wire approximation to the electric-field integral equation. The solution employs subsectional collocation with a nine-term quadratic basis function and delta-function weights, in both space and time. DOE

N84-30163# Los Alamos Scientific Lab., N. Mex.
PRACTICAL ASPECTS OF TUNING A RINGED RFQ
F. O. Purser, J. M. Potter, and F. J. Humphry Apr. 1984 4 p refs Presented at the Linear Accelerator Conf., Darmstadt-Seeheim, West Germany, 7-11 May 1984
(Contract W-7405-eng-36)
(DE84-011366; LA-UR-84-1308; CONF-840529-14) Avail: NTIS HC A02/MF A01

A radio frequency quadrupole (RFQ) constructed at Los Alamos for high current H(-) operation at 425 MHz and 2.0-MeV output energy was retrofitted with vane coupling rings (VCRS) introduced at Berkeley. The initial set of seven complete VCR pairs produced excessive operating frequency change, and an arrangement of alternating horizontal and vertical coupling rings eventually was adopted. Because of the periodicity and length of the system, and effects were pronounced. A different type of end tuner was used to adjust the field strength at the ends of the structure that should be of general utility for high power RFQs. Tuning data for various ring and tuning configurations are given. DOE

N84-30164# California Univ., Berkeley. Lawrence Berkeley Lab.
PERFORMANCE OF BEVERAGE ANTENNAS AT LOW ANGLES
G. J. Burke, R. J. King, R. J. Lytle, and E. K. Miller Nov. 1983 21 p refs Sponsored in part by DARPA
(Contract W-7405-eng-48)
(DE84-011163; UCID-19925-Rev-1) Avail: NTIS HC A02/MF A01

Numerical modeling of Beverage and monopole antennas shows the fields of both antennas to have a similar dependence on range and height above ground, with the Beverage antenna having slightly greater gain in the forward direction due to its directivity. The use of multiple Beverage antennas closely spaced was found to increase the efficiency and gain in the forward direction for short Beverage antennas. For the longer antenna considered for the HF bistatic radar, the decrease in directivity for two closely spaced antennas reduced the forward gain. DOE

N84-30165# Los Alamos Scientific Lab., N. Mex.
GENERAL-PURPOSE RFQ DESIGN PROGRAM
E. A. Wadlinger 1984 3 p refs Presented at Linear Accelerator Conf., Darstadt-Seeheim, West Germany, 7 May 1984
(Contract W-7405-eng-36)
(DE84-011327; LA-UR-84-1279; CONF-840529-11) Avail: NTIS HC A02/MF A01

A general-purpose, radio-frequency quadrupole (RFQ) design program that allows maximum flexibility in picking design algorithms was within. The program optimizes the RFQ on any combination of design parameters while simultaneously satisfying mutually compatible, physically required constraint equations. It can be very useful for deriving various scaling laws for RFQs. This program has a friendly user interface in addition to checking the consistency of the user defined requirements and is written to minimize the effort needed to incorporate additional constraint equations. The program is described and examples are presented. DOE

N84-30166# Oak Ridge National Lab., Tenn. Energy Div.
NUCLEAR ELECTROMAGNETIC PULSE (EMP) AND ELECTRIC POWER SYSTEMS
P. R. Barnes, E. F. Vance, and H. W. Askins, Jr. (The Citadel) Apr. 1984 68 p refs
(Contract DE-AC05-84OR-21400)
(DE84-010665; ORNL-6033) Avail: NTIS HC A04/MF A01

A nuclear detonation at high altitudes produces a transient electromagnetic pulse (EMP) of high-intensity electromagnetic fields. A single high-altitude burst can subject most of the continental United States to a strong EMP. These intense fields induce voltage and current transients in electrical conductors. Surges would be induced by EMP in transmission and distribution circuits and in control and communication elements in electric power systems throughout the national grid. Such widespread disturbances could upset the stability of electrical energy systems and result in massive power failures. The extent and nature of EMP-caused damages are not well known for utility electric power systems. Failures are likely to be associated with insulation damage and failures of low-voltage and solid-state components. It is concluded from a review of past studies that EMP may pose a serious threat to the nation's electrical energy supply. DOE

N84-30167# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).
INVENTORY RF RADIATION LEVELS IN THE NETHERLANDS,

PART 1
A. B. Woltering and H. A. J. M. vanHoof Apr. 1984 96 p refs In DUTCH; ENGLISH summary
(Contract L82/Alg/107)
(LEOK-TR-1984-02-Pt-1; TDCK-79159) Avail: NTIS HC A05/MF A01

An inventory of field strengths or power densities near electromagnetic radiation sources in the Netherlands was made in the period 1982 to 1983. The results are arranged according to radiation source categories, supplemented with comparable data from the literature. It is indicated where data necessary for an inventory, are still missing. Radio frequency dosimetry is discussed. Exposure limits in use are given. Author (ESA)

N84-30168# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).
DESCRIPTION OF A MICROWAVE SYSTEM FOR THE MEASUREMENT OF CLOSE TO CARRIER AM AND FM NOISE SPECTRA
A. B. Woltering Feb. 1984 23 p refs In DUTCH; ENGLISH summary
(Contract HDO-TNO-0.0373/K)
(LEOK-TR-1984-04; TDCK-79062) Avail: NTIS HC A02/MF A01

A measuring system for close-to-carrier AM and FM noise of CW generators and amplifiers (TWT, single-sideband amplifier, etc.) was built for the X-band. The measured limiting sensitivity is -100 dBc/Hz at 2 kHz off the carrier in a 145 Hz measuring bandwidth. At 10 kHz off the carrier this sensitivity is -120 dBc/Hz, and at 100 kHz it is -145 dBc/Hz. Author (ESA)

N84-30169# Rome Univ. (Italy). Dept. of Physics.
EVALUATION OF THE ATTENUATION LENGTH OF A SCINTILLATOR BY MEANS OF A COMPUTER SIMULATION OF THE LIGHT COLLECTION EFFICIENCY IN LONG SCINTILLATION COUNTERS
W. Pecorella, L. Petrillo, and M. Severi 1 Feb. 1984 34 p
(Nota-Interna-820) Avail: NTIS HC A03/MF A01

Scintillation attenuation length (SAL) of a scintillation counter was derived from computer simulations of possible systematic contributions involved in a standard method for the measure of SAL. Since they depend on the geometrical dimensions of the counter and on the reflectivity on its boundary surfaces, different values of these parameters were used as program inputs. The light collection efficiencies in all the analyzed configurations were also obtained. Author (ESA)

N84-30170# Institute for Telecommunication Sciences, Boulder, Colo.
THE EVALUATION OF PREDICTION MODELS FOR MICROWAVE ATTENUATION BY RAINFALL
H. T. Dougherty and E. J. Dutton Feb. 1984 37 p refs
(PB84-182104; NTIA-Report-84-145) Avail: NTIS HC A03/MF A01 CSCL 17B

The present status of predicting the attenuation of microwaves by rainfall is reviewed, identifying the current difficulties, objectives, and achievements. The major difficulties hindering further progress are those of: inadequately summarized observational data for comparison with prediction models; a lack of clear criteria for the acceptance of prediction models; and rational measures for ranking competing prediction models. Quantitative summary procedures, acceptance criteria and ranking measures are proposed. With the aid of such, the potentially massive task of comparisons of observations and predictions becomes feasible. GRA

N84-30171# National Bureau of Standards, Boulder, Colo. Fracture and Deformation Div.
RESIDUAL STRESS MEASUREMENTS USING SHEAR-HORIZONTAL WAVES FROM ELECTROMAGNETIC ACOUSTIC TRANSDUCERS
R. B. King and C. M. Fortunko Mar. 1984 59 p refs Sponsored in part by Naval Ship Research and Development Center
(PB84-190636; NBSIR-84-3002) Avail: NTIS HC A04/MF A01 CSCL 14B

The collection of technical papers covers a two-year effort on an approach to measuring residual stresses using changes in ultrasonic wave velocities of horizontally polarized shear waves produced by electromagnetic-acoustic transducers. The initial three papers deal with the theoretical developments pointing to the measurement of in-plane residual stress as well as preliminary experimental verification. The later two papers generalize this theory and extend it to include surface residual stress measurement in an arbitrary plane; again, empirical validation is included. GRA

N84-30172# Bureau of Mines, University, Ala.
GROUND PENETRATING RADAR: A REVIEW OF ITS APPLICATION IN THE MINING INDUSTRY, INFORMATION CIRCULAR 1984
W. E. Pittman, Jr., R. H. Church, W. E. Webb, and J. T. McLendon Feb. 1984 30 p refs
(PB84-178292; BM-IC-8964) Avail: NTIS HC A03/MF A01 CSCL 08I

The Bureau of Mines, as part of its Health and Safety Technology Program, is conducting research on the use of ground penetrating radar (GPR) for mine hazard detection. GPR offers a possibility of mapping immediate below-surface geologic conditions, including faulting and other anomalies, thereby exposing potential safety hazards to miners. GRA

N84-30173# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
LOCALLY OPTIMUM AND SUBOPTIMUM DETECTOR PERFORMANCE IN A NON-GAUSSIAN INTERFERENCE ENVIRONMENT
A. D. Spaulding Jan. 1984 63 p refs
(PB84-184738; NTIA-84-142) Avail: NTIS HC A04/MF A01 CSCL 09D

As the normally assumed white Gaussian interference is the most destructive in terms of minimizing channel capacity, substantial improvement can usually be obtained if the real world interference environment (nonGaussian) is properly taken into account in this report, the performance of the locally optimum Bayes detector (LOBD) is compared with the performance of various ad hoc nonlinear detection schemes. The known results are reviewed and then it is demonstrated that these theoretical results may be misleading due to the assumptions that are required in order to derive them analytically. For a particular type of broadband impulsive noise, the critical assumptions of sufficiently small signal level and large number of samples (large time bandwidth product so that the Central Limit Theorem applies) are removed; the first, analytically, and the second, by computer simulation. Author (GRA)

N84-30492# Joint Publications Research Service, Arlington, Va.
SMALL-ANGLE METHOD IN STUDY OF SINGLE AND MULTIPLE SCATTERING Abstract only
V. F. Belov, A. G. Borovoy, N. I. Vagin, and S. N. Volkov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 71-72 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 323-327 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30872# Joint Publications Research Service, Arlington, Va.
INSTABILITY OF COLLAPSING CYLINDRICAL SHELL DURING MAGNETIC ENERGY DENSITY Abstract Only
A. I. Pavlovskiy, M. I. Dolotenko, N. P. Kolokochikov, A. I. Bykov, N. I. Yegorov, and O. M. Tatsenko *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 9 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1360-1364 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N84-30174# Japan Broadcasting Corp., Tokyo. Acoustics and Radio Engineering Research Div.
A METHOD OF MEASURING DISTORTION NOISE IN DIGITAL AUDIO EQUIPMENT
Hayao Tanabe and Takashi Wakuri Mar. 1984 8 p refs
(NHK-Labs-Note-299; ISSN-0027-657X) Avail: NTIS HC A02/MF A01

An experimental system, developed to measure the dynamic characteristics of digital audio systems, can measure dynamic distortion as little as a 16-bit quantized noise-level with high accuracy. The system eliminates a certain frequency range from the test-signal, and the rest of the signal is fed to the equipment under test. Any output appearing in the eliminated frequency range is taken as distortion produced by it. It is measured and the amount of distortion may be represented by the ratio of this measured level to the original signal level in the eliminated frequency range. No special test-signal is needed, and program such as those stored in conventional analog tape recorders can be used. Thus, the performance of audio equipment can be measured under operational conditions with real program signals. A.R.H.

N84-30175# Japan Broadcasting Corp., Tokyo.
TWO-WAY UNIDIRECTIONAL CONDENSER MICROPHONE
Akira Morita and Akio Mizoguchi Mar. 1984 6 p
(NHK-Labs-Note-297; ISSN-0027-657X) Avail: NTIS HC A02/MF A01

A microphone for digital use is described which has a flat frequency-response over a wide range, from 20 Hz to 20 kHz; high sensitivity; and a unidirectional pattern over the whole frequency range. The principal ratings of the microphone are tabulated. A.R.H.

N84-30176# Stanford Linear Accelerator Center, Calif.
KLYSTRON VOLTAGE PULSE TIMING EXPERIMENT
H. Hogg, H. Deruyter, and J. Bernstein 21 Jun. 1983 9 p
(Contract DE-AC03-76SF-00515)
(DE84-011753; SU-SLAC-CN-233) Avail: NTIS HC A02/MF A01

The advent of single bunch beam operations for the Stanford Linear Collider (SLC), coupled with the use of the SLED pulse compression system (which produces an RF output to the accelerator which changes drastically in one section filling time) and the rapidly rising cost of electrical power experienced in recent years, made it desirable to review the specifications of the voltage pulse supplied by the modulator to the klystron. The possibilities of increasing modulator efficiency, are being studied by others. The energy contained in the skirts of the voltage pulse on each side of the flat top region. Results are reported from an experiment performed as a first step towards finding what penalties are paid for reducing the voltage pulse width so that the skirts encroach upon the time that the RF drive pulse is on. DOE

N84-30177# Sci-Tec, Inc., Princeton, N.J.
A PROGRAM TO IMPROVE SOLAR BLIND UV (ULTRAVIOLET) FLASH LAMPS Report, 1 Sep. 1980 - 31 May 1982
W. J. Miller Oct. 1983 64 p
(Contract N00014-80-C-0763)
(AD-A141909; TR-83-016) Avail: NTIS HC A04/MF A01 CSCL 13/1

A study was conducted of UV light sources, particularly Xenon/H2 flash lamps, in an effort to achieve higher efficiencies in the upper end of the solar blind wavelength region for application to UV communication devices. Lamps containing a number of inert gases with and without added H2, were subjected to detailed spectroscopic examination and their UV output efficiencies compared to that of conventional commercially available lamps of similar physical configuration. A highly versatile power supply capable of delivering very short pulses at variable frequency and power level was designed and built for this purpose. It incorporates the capacity of hold off capacitor recharge for specifiable times between pulses in order to minimize premature lamp firing which produces holdover and renders the source useless for Fm or pulse position modulation operation. Modest increases in efficiency were achieved by increasing Xe pressure and operating the lamps at the highest power and voltage levels compatible with the structural strength of the lamp and frequency range selected for operation. GRA

N84-30178# Defence Research Establishment, Ottawa. (Ontario).
RAPID ELECTROLYTE EXCHANGE PROCEDURES FOR 22 AH NICKEL-CADMIUM CELGARD CELLS
G. Verville and P. Powell Apr. 1984 17 p
(AD-A142004; DREO-TN-83-25) Avail: NTIS HC A02/MF A01 CSCL 10/3

State-of-the-health analysis of Nickel-Cadmium aircraft batteries rejected as being unsatisfactory by CF bases has shown that most of the problems encountered can be related to the fact that the KOH concentration in the cells is too low and/or the carbonate concentration is too high. Exchange of electrolyte restored the performances of the cells but is time consuming, one to two weeks for a battery using the charge-KOH exchange-discharge procedure. The present technical note describes some of the tests performed and a procedure for rapidly exchanging the electrolyte in 22 AH Nickel-Cadmium Aircraft Celgard cells. Author (GRA)

N84-30179# Office of Naval Research, London (England).
EUROPE APPROACHES CHAOS WITH ELECTRICAL CIRCUITS Technical Report
D. Mosher 24 Apr. 1984 17 p
(AD-A142085; ONRL-R-6-84) Avail: NTIS HC A02/MF A01 CSCL 09/1

In this report, the underlying concepts for the period-doubling route to chaos are presented, and the scope of recent research in a variety of physical systems is briefly noted. Then European research investigating chaotic behavior in nonlinear, driven electrical circuits is discussed in detail. These circuits - really nonlinear analog computers which solve the differential equations describing idealized physical systems - represent a bridge between the simple and highly abstract deterministic models and the experiments where complicating and competing effects can obscure the universal behavior. Author (GRA)

N84-30180# Sheffield Univ. (England).
THE 8TH EUROPEAN SPECIALIST WORKSHOP ON ACTIVE MICROWAVE SEMICONDUCTOR DEVICES 4-6 MAY 1983
6 May 1983 54 p Workshop held at Maidenhead, England, 4-6 May 1983
(Contract DAJA45-83-M-0168)
(AD-A142252) Avail: NTIS HC A04/MF A01 CSCL 09/1

Contents: Materials Preparation and Device Processing; FET Devices; Bipolar Devices; GaAs ICs; Novel Devices, Materials and Effects; and Two Terminal Devices. GRA

N84-30181# Illinois Univ., Urbana. Coordinated Science Lab.
A SIMULATION PROGRAM WITH LATENCY EXPLOITATION FOR THE TRANSIENT ANALYSIS OF DIGITAL CIRCUITS M.S. Thesis
S. A. Sohail Aug. 1983 85 p
(Contract N00014-79-C-0424)
(AD-A142377; R-993; UILU-ENG-83-2214) Avail: NTIS HC A05/MF A01 CSCL 14/2

This report examines the efficiency that can be obtained in the simulation of large digital integrated circuits with the implementation of latency, that is, inactive gates in a given time interval are bypassed in the simulation. In particular the latency criterion in the program SLATE is studied, and a user's guide to SLATE is included. Author (GRA)

N84-30182# Illinois Univ., Urbana. Coordinated Science Lab.
MODELING AND EXTRACTION OF INTERCONNECT PARAMETERS IN VERY-LARGE-SCALE INTEGRATED CIRCUITS Ph.D. Thesis
C. P. Yuan Aug. 1983 200 p
(Contract N00014-79-C-0424)
(AD-A142381; R-994; UILU-ENG-83-2215) Avail: NTIS HC A09/MF A01 CSCL 09/5

The increased complexity of the very large scale integrated circuits (VLSI) has greatly impacted the field of computer-aided design (CAD). One of the problems brought about is the interconnection problem. In this research, the goal is two fold. First of all, a more accurate numerical method to evaluate the interconnect capacitance, including the coupling capacitance between interconnects and the fringing field capacitance, was investigated, and the integral method was employed. Two FORTRAN programs 'CAP2D' and 'CAP3D' based on this method were developed. Second, a PASCAL extraction program emphasizing the extraction of interconnect parameters was developed. It employs the cylindrical approximation formula for the self-capacitance of a single interconnect and other simple formulas for the coupling capacitances derive by a least square method. The extractor assumes only Manhattan geometry and NMOS technology. Four-dimensional binary search trees are used as the basic data structure. Author (GRA)

N84-30183# Rome Air Development Center, Griffiss AFB, N.Y.
PROPAGATION LOSS IN ELECTROSTATICALLY VARIABLE SAW DELAY LINES
H. L. Bertoni Feb. 1984 51 p
(AF Proj. 2305)
(AD-A142433; RADC-TR-84-6) Avail: NTIS HC A04/MF A01 CSCL 09/1

Variations in SAW time delay due to an applied dc electric field has been suggested as a means for achieving the phase shift needed for each radiating element in phased-array antennas. Important device parameters are: (1) insertion loss and, (2) sensitivity of delay change to dc terminal voltage. These parameters can be in competition, in that device modifications intended to improve one parameter may make the other worse. These parameters are considered for the normal-field configuration, and for the in-plane configuration in which both dc electrodes are on the same surface as the SAW. The in-plane configuration can have high-voltage sensitivity if the electrodes are close together, but diffraction loss for this case is found to be large for long path lengths. Methods for limiting diffraction loss without reducing voltage sensitivity are investigated. Author (GRA)

N84-30184# Michigan Univ., Ann Arbor. Electron Physics Lab.
LARGE-SIGNAL CHARACTERIZATION OF NONLINEAR TWO-PORT ACTIVE NETWORKS Interim Technical Report, 1 Mar. 1981 - 30 Jun. 1983
D. C. Yang Apr. 1984 138 p
(Contract F33615-81-K-1429)
(AD-A142462; TR-163; AFWAL-TR-84-1034; ITR-163) Avail: NTIS HC A07/MF A01 CSCL 09/5

The objectives of this investigation include the development of a large-signal characterization procedure for nonlinear active two-port networks, analysis of the large-signal properties of MESFETs, and establishment of a large-signal MESFET equivalent circuit model. An approach for characterizing the single-frequency properties of a nonlinear two-port network is presented. The characterization results are useful in optimizing the external circuits for particular applications such as amplifiers and oscillators. The information obtained regarding network properties can be used for establishing amplifier and oscillator design and stability criteria. A GaAs MESFET was used as the nonlinear active two-port network, and its large-signal characteristics were measured. The nonlinear properties of the MESFET were investigated over the 7- to 13 GHz frequency range. The common drain configuration was studied extensively since this configuration is particularly advantageous for oscillator applications. GRA

N84-30185# Stanford Univ., Calif.
RESEARCH IN VLSI (VERY LARGE SCALE INTEGRATION) SYSTEMS Technical Progress Report, Nov. 1983 - Mar. 1984
Mar. 1984 54 p
(Contracts MDA903-84-K-0062; MDA903-83-C-0335)
(AD-A142511) Avail: NTIS HC A04/MF A01 CSCL 09/5

This report summarizes progress in the DARPA funded VLSI Systems Research Projects from November 1983 to March 1984, inclusive. The major areas under investigation have included: analysis and synthesis design aids, applications of VLSI, special purpose chip design, VLSI computer architectures, signal processing algorithms and architectures, reliability studies, hardware specification and verification, VLSI theory, and VLSI fabrication. The major research problems are introduced and progress is discussed; the Appendix contains a list of published research papers from these projects. Author (GRA)

N84-30186# Rio Grande Associates, Houston, Tex.
THE TEMPERATURE SENSITIVITY OF DOUBLY ROTATED QUARTZ RESONATORS
R. R. Beland Hanscom AFB, Mass. AFGL Nov. 1983 82 p
(Contract F19628-81-C-0128)
(AD-A142537; AFGL-TR-84-0078; SR-2) Avail: NTIS HC A05/MF A01 CSCL 09/1

Thickness-mode quartz resonators have long been used for timing and frequency control. It is well known that a change in temperature results in a change in the resonance frequencies of such quartz plates. Thus, a major requirement for precision frequency applications is that these temperature deviations are minimized. This report summarizes a detailed numerical investigation of the temperature sensitivity of doubly rotated quartz resonators. Various measures of sensitivity are used for the temperature range -40 to 80 C. Several cuts of quartz with stable temperature behavior are described and compared. Author (GRA)

N84-30187# Michigan Univ., Ann Arbor.
LOSSLESS SYMMETRIC TEM LINE IMPATT DIODE POWER COMBINERS Interim Report, 1 Mar. 1981 - 30 Jun. 1983
R. Actis Apr. 1984 150 p
(Contract F33615-81-K-1429)
(AD-A142599; TR-164; AFWAL-TR-84-1035) Avail: NTIS HC A07/MF A01 CSCL 09/5

The results of an experimental investigation into a new approach to circuit-level power combining of negative-resistance devices are presented. The approach uses the properties of symmetric lossless TEM line combining networks together with the bandlimited characteristics of IMPATT diodes to achieve stable combiner designs having improved bandwidths over other approaches. The combining networks utilized in this investigation fall into the category of N-way nonresonant combiners which are often associated with various bandlimiting resistive stabilization techniques for suppressing non-power-producing interactions among the devices. This combining design requires no such stabilizing scheme. Suppression of undesired odd modes is accomplished in lossless circuits by an appropriate combinations of device and circuit which provides the necessary condition for a stable combiner. GRA

N84-30188# Rome Air Development Center, Griffiss AFB, N.Y.
NULLING IN ARRAY PATTERNS WITH ORTHOGONAL ANALYTIC CANCELLATION BEAMS
M. J. OBrien Feb. 1984 22 p
(AF Proj. 2305)
(AD-A142719; AD-F630334; RADC-TR-84-38) Avail: NTIS HC A02/MF A01 CSCL 09/5

A method of reducing the coupling between the analytic beams formed to place multiple nulls in the radiation patterns of phased array antennas is developed using cancellation beams that are orthogonal in the sense that each beam has nulls in the directions where the other beams have maximums. A formulation for these beams is presented for arrays in which the element amplitude and phase are adjusted and for arrays in which only the phase is adjusted. Author (GRA)

N84-30189# Texas Univ., Austin. Microwave Lab.
A STUDY OF DISTRIBUTED MILLIMETER-WAVE ISOLATORS
S. W. Yun and T. Itoh 1 May 1984 114 p
(Contract N00014-79-C-0553)
(AD-A142729; NW-84-3) Avail: NTIS HC A06/MF A01 CSCL 09/1

Nonreciprocal devices, such as circulators and isolators, are among the important devices for microwave and millimeter-wave communication systems. Two types of isolators which can be used at both microwave and millimeter-wave frequencies have been studied both theoretically and experimentally. One isolator uses a dielectric guide and a ferrite slab, while the other uses a hollow image guide with a dielectric overlay. GRA

N84-30190# Argonne National Lab., Ill.
ADVANCED BATTERY DEVELOPMENT IN THE US
H. Shimotake and P. A. Nelson 1984 17 p Presented at the Government Industrial Research Inst. Seminar, Osaka, 23 Mar. 1984
(Contract W-31-109-eng-38)
(DE84-010505; CONF-8403116-1) Avail: NTIS HC A02/MF A01

Batteries for load leveling and electric vehicle applications are under development in the United States. The most difficult requirements for these applications are long cycle life, high power density, and low cost. Steady progress is being made in developing advanced batteries. The US Department of Energy is sponsoring development of sodium sulfur, zinc bromine, zinc chloride, and aluminum air batteries. Exploratory research is being conducted on a variety of cell systems, such as lithium metal sulfide, alkali metal sulfur, glass electrolyte, and low temperature organic electrolyte. This paper reviews the US government effort in the development of advanced batteries and discusses some of the key systems. DOE

N84-30191# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
SECONDARY ALKALINE BATTERIES
James McBreen Mar. 1984 39 p refs Submitted for publication
(Contract DE-AC02-76CH-00016)
(DE84-010963; BNL-34636) Avail: NTIS HC A03/MF A01

The overall reactions (charge/discharge characteristics); electrode structures and materials; and cell construction are studied for nickel oxide-cadmium, nickel oxide-iron, nickel oxide-hydrogen, nickel oxide-zinc, silver oxide-zinc, and silver oxide-cadmium, silver oxide-iron, and manganese dioxide-zinc batteries. DOE

N84-30192# Brookhaven National Lab., Upton, N. Y.
RECHARGEABLE ZINC BATTERIES
J. McBreen Jan. 1984 19 p refs Presented at 6th Australian Electrochem. Conf., Geeland, Australia, 19 Feb. 1984
(Contract DE-AC02-76CH-00016)
(DE84-008947; BNL-34390; CONF-840279-1) Avail: NTIS HC A02/MF A01

The status of the research and development programs, in the USA, on rechargeable zinc batteries is discussed. The review is confined to systems that are now under development. These are the zinc-bromine, zinc-chlorine, zinc-ferricyanide and zinc-nickel oxide systems. Most of the electrochemical problems with these batteries are due to the zinc electrode. Recent advances in zinc batteries include the use of additives and modified charging methods. Recent work by the author and others on the mechanism of the zinc electrodes in acid electrolytes is discussed and the mechanistic aspects of the effect of additives and charging methods is also reviewed. DOE

N84-30193# Argonne National Lab., Ill. Fusion Power Program.
NEW 1-PHASE DUAL CONVERTER FOR SUPERCONDUCTING INDUCTIVE ENERGY STORAGE AND TRANSFER APPLICATIONS: THE 1-PHASE INDUCTOR-CONVERTER BRIDGE
Mehrdad Ehsani and Robert L. Kustom Mar. 1984 60 p refs
(Contract W-31-109-eng-38)
(DE84-012118; ANL/FPP-TM-182) Avail: NTIS HC A04/MF A01

The theoretical and experimental development of the one phase induction converter bridge (ICB) is discussed. The basic operating principles of the circuit are described. Results of the first experimental operation and control of the one phase ICB are presented and explained. The transient and steady state behavior of the circuit and some of its features are discussed. DOE

N84-30194# Los Alamos Scientific Lab., N. Mex.
DIAGNOSTICS OF A HIGH CURRENT CAPILLARY DISCHARGE
D. R. Kania and L. A. Jones 29 Mar. 1984 6 p refs Presented at the Conf. of Dense Z-Pinches for Fusion, Alexandria, Va., 29-30 Mar. 1984
(Contract W-7405-eng-36)
(DE84-011369; LA-UR-84-1249; CONF-8403100-5) Avail: NTIS HC A02/MF A01

Thin (10 to 25 micron diameter) capillaries are fabricated in suitably configured insulators for use in pulse power machines. Large currents can be used to heat these capillaries which produce photons with energies greater than 1 keV. DOE

N84-30195# Pugh (Paul F.) and Associated Professional Engineers, Oakland, Calif. Energy Conservative Cable Dept.
ENERGY CONSERVATIVE CABLE SYSTEM DEMONSTRATION PROJECT Technical Progress Report, 8 Dec. 1983 - 14 Apr. 1984
Paul F. Pugh 14 Apr. 1984 5 p
(Contract DE-FG01-81CS-15074)
(DE84-008982; DOE/CS-15074/T4) Avail: NTIS HC A02/MF A01

This is a short report reviewing the technical progress testing of a energy conservative cable system. Test results are given. DOE

N84-30196# Brookhaven National Lab., Upton, N. Y. Dept. of Applied Science.
EFFECT OF CHARGING METHODS ON BATTERY ELECTRODES
James McBreen 1983 9 p refs Presented at the Electrochem. Soc. Fall Meeting, Washington, D.C., 9 Oct. 1983
(DE84-010287; BNL-34479; CONF-831086-13) Avail: NTIS HC A02/MF A01

The effect of modified charging methods on the structure and behavior of several battery electrodes are reviewed. These include the alkaline cadmium, zinc, silver oxide and nickel oxide electrodes. Also included are recent results obtained for pasted zinc electrodes and in acidic zinc chloride electrolytes. Modified charging methods can greatly affect electrodes particularly when the charging reaction involving the nucleation, and growth of a new phase. Many of the observed morphological effects are described with regard to nucleation and orientation effects. DOE

N84-30197# California Univ., Livermore. Lawrence Livermore Lab.
DEVELOPMENT OF HYDROCYCLONES FOR ALUMINUM/AIR BATTERY APPLICATIONS
M. Newman 16 Apr. 1984 22 p refs
(Contract W-7405-eng-48)
(DE84-011403; UCID-20061) Avail: NTIS HC A02/MF A01

An aluminum air battery consists of three main components: a galvanic cell stack fueled by aluminum and water, a crystallizer (a fluidized bed), and a hydro-cyclone, to separate electrolyte from aluminum trihydroxide. The crystallizer stabilizes the electrolyte by extracting excess aluminum trihydroxide. A separator (the hydrocyclone) is necessary to divert heavy particles to the crystallizer while recycling fine particles to the cells. A hydrocyclone suited to this application was developed based on the design of a commercially available unit, the PC-1, manufactured by Krebs Engineers of Menlo Park. Information supplied by Krebs indicated that a cut point of 15 micrometers could be achieved. At time intervals of

120, 240 and 360 minutes of testing, the particle size cut point remained constant at 20.2-25.4 micrometers. The separation coefficient was .47, .48 and .51, respectively. The discrepancy between the actual and the anticipated results is most likely due to variance from suggested sizing and the use of a tangential feed instead of the involuted feed of the Krebs design. DOE

N84-30198# Exide Management and Technology Co., Yardley, Pa.

TESTING, DATA ANALYSIS AND ENGINEERING SERVICES ON LEAD-ACID LOAD LEVELING BATTERIES

W. P. Sholette Apr. 1984 42 p refs
(Contract DE-AC04-76DP-00789)
(DE84-011523; SAND-84-7104) Avail: NTIS HC A03/MF A01

Eight 35-plate, advanced lead acid, load-leveling cells were tested. Discharging to a depth of 80% of the 5-h rated capacity (3100 Ah), their temperature remains at 39(0)C + or - 5(0). Capacity and energy output, measured by periodic 100%, depth-of-discharge, capacity measuring cycles, has reached peak values for all cells. Also, deep cycle accelerated tests at 70(0)C + or - 5(0) were completed on the 10 longest lived 17 plate cells; cycle life to 80% initial 5-h rated energy output ranged from 1174 to 1468 actual cycles (equivalent to 5940 to 7455 cycles at 25(0)C). DOE

N84-30199# Sandia Labs., Albuquerque, N. Mex.

UV LASER TRIGGERING OF CROWBARS USED IN THE SANDIA LIGHTNING SIMULATOR

Murphy J. Landry and William P. Brigham 1984 13 p refs
Presented at the Intern. Conf. on Lightning and Static Elec., Orlando, Fla., 22 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-009064; SAND-83-2306C; CONF-8406100-1) Avail: NTIS HC A02/MF A01

The techniques of IR and UV laser triggered switching of gaps were applied to crowbar switching two Marx generators, delivering greater than or equal to 250 to 50 kA in small and large impedance loads. Crowbar switching delays of 0.08 to 0.28 (MU)s were observed if the laser radiation arrived in the crowbar gaps when its voltage was 44% of its maximum applied voltage or at 23 to 68% of its self break voltage. A 5.0 cm crowbar gap with 35 mJ of lambda = 249 nm radiation was successfully triggered when filled with 80 psig of SF6. Electrodes operated with 40 Coulombs of charge for 47 shots without detrimental surface damage. DOE

N84-30200# Los Alamos Scientific Lab., N. Mex.

ELECTRONICS DIVISION RESEARCH AND DEVELOPMENT Progress Report, 1 Oct. 1982 - 30 Sep. 1983

M. D. J. MacRoberts, comp. and E. J. Courtney, comp. Mar. 1984 197 p refs
(Contract W-7405-eng-36)
(DE84-011024; LA-10059-PR) Avail: NTIS HC A09/MF A01

The status of the research development activities in the Electronics Division at the Los Alamos National Laboratory is described. Much of the work described is sponsored by the Laboratory; however, other topics are included for completeness. The Fuels Cells for Transportation Applications and the majority of the electrochemistry research are reported separately in LA-9787-PR. The Thermionic Integrated Circuits are being reported separately. The following topics are continuations of articles reported in Electronics Division Research and Development, October 1, 1981-September 30, 1982 (LA-9726-PR): Photoconductive Circuit Elements, Photoconductive Materials for Far-Infrared Detector Applications, Saturable Ferromagnetic Elements, Repetitive Opening Switches, Capacitor Test Facility, Fast Gating of Microchannel-Plate Image Intensifiers, and Oxygen-Reduction Reaction - Electrode Kinetics and Electrocatalysis. The following topics are new work or were included for completeness: Photoconductive Power Switches, Ion Beam Analysis, Link Access Control and Encryption System, Coded Aperture Imaging of Gamma-Ray Sources, and Multilayer Printed Wiring Boards. DOE

N84-30201# Department of Energy, Washington, D. C.

ELECTRON EMITTING FILAMENTS FOR ELECTRON DISCHARGE DEVICES Patent Application

Ka-Ngo Leung, Philip A. Pincosy, and Kenneth W. Ehlers, inventors (to DOE) Filed 10 Jun. 1983 18 p
(Contract DE-AC03-76SF-00098)
(DE84-011098; US-Patent-Appl-SN-503373) Avail: NTIS HC A02/MF A01

Electrons are copiously emitted by a device comprising a loop-shaped lament made of lanthanum hexaboride. The filament is directly heated by an electrical current produced along the filament by a power supply connected to the terminal legs of the filament. To produce a filament, a diamond saw or the like is used to cut a slice from a bar made of lanthanum hexaboride. The diamond saw is then used to cut the slice into the shape of a loop which may be generally rectangular, U-shaped, hairpin-shaped, zigzag-shaped, or generally circular. The filaments provide high electron emission at a relatively low operating temperature, such as 1600(0)C. To achieve uniform heating, the filament is formed with a cross section which is tapered between the opposite ends of the filament to compensate for nonuniform current distribution along the filament due to the emission of electrons from the filament. DOE

N84-30202# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

NEAR-THRESHOLD FATIGUE CRACK PROPAGATION: A PERSPECTIVE ON THE ROLE OF CRACK CLOSURE

S. Suresh (Brown Univ., Providence, R. I.) and R. O. Ritchie Nov. 1983 76 p refs Presented at the Intern. Symp. on Concepts of Fatigue Crack Growth Threshold, Philadelphia, 2-6 Oct. 1983 Submitted for publication
(Contract DE-AC03-76SF-00098)
(DE84-009669; LBL-16263; CONF-8310268-1) Avail: NTIS HC A05/MF A01

In recent years, mechanistic and continuum studies on fatigue crack propagation, particularly at near-threshold levels, highlighted a dominant role of crack closure in influencing growth rate behavior. Various sources of closure induced by cyclic plasticity, corrosion deposits, irregular fracture morphologies, viscous fluids and metallurgical phase transformation are reviewed and modeled. It is shown that many of the commonly observed effects of mechanical factors, such as load ratio, microstructural factors, such as strength and grain size, and certain environmental conditions can be traced to the extrinsic influence of closure in modifying the effective driving force for crack extension. The implacations of such closure mechanisms are discussed in the light of constant and variable amplitude fatigue behavior, the existence of a threshold stress intensity for no fatigue crack growth and the validity of such threshold concepts for the case of short fatigue cracks. DOE

N84-30203# Los Alamos Scientific Lab., N. Mex.

SOME CONSIDERATIONS ON SILICONE OIL IN HIGH-CURRENT AND ENERGY-DISCONNECTING MECHANISMS

H. F. Vogel Mar. 1984 10 p refs
(Contract W-7405-eng-36)
(DE84-011021; LA-10035-MS) Avail: NTIS HC A02/MF A01

Silicone oil is considered inflammable. The dissociation products generated by an electric arc under silicone oil form a highly explosive mixture with air. The arc energy required for dissociation to be 32 kJ per liter of gas mixture at standard pressure and temperature was calculated. The arc voltage gradient at a pressure of 50 atm and current density of 1 kA/mm(2) to be 0.5 kV/cm, resulting in an arc voltage of several kV, depending on the arc length was also calculated. In a multikiloampere arc, the resulting arc power is likely to cause a pressure of many atmospheres in a shock wave. DOE

N84-30204# Department of Energy, Washington, D. C.

RIGID INDENTED CYLINDRICAL CATHODE FOR X-RAY TUBE Patent Application

Claude R. Hudgens, inventor (to DOE) Filed 3 Jun. 1983 11 p

(Contract DE-AC04-76DP-00053)
(DE84-011093; US-Patent-Appl-SN-501312) Avail: NTIS HC A02/MF A01

A rigid indented cylindrical cathode for an X-ray tube is described. A cathode assembly for a vacuum tube includes a wire filament, a straight tubular anode parallel to and surrounding the wire filament, insulating spacers for rigidly fastening the filament with respect to the anode. One side of the anode is indented or flattened such that only one portion of the anode is heated to emitting temperatures by the filament. DOE

N84-30205# Department of Energy, Washington, D. C.
STEAM REFORMING OF FUEL TO HYDROGEN IN FUEL CELL Patent Application
John E. Young and Anthony V. Fraioli, inventors (to DOE) Filed 13 Jul. 1983 11 p
(Contract W-31-109-eng-38)
(DE84-011115; US-Patent-Appl-SN-513523) Avail: NTIS HC A02/MF A01

A fuel cell is described capable of utilizing a hydrocarbon such as methane as fuel and having an internal dual catalyst system within the anode zone, the dual catalyst system including an anode catalyst supporting and in heat conducting relationship with a reforming catalyst with heat for the reforming reaction supplied by the reaction at the anode catalyst. DOE

N84-30206# Sandia Labs., Albuquerque, N. Mex.
ZINC/BROMINE BATTERIES: A STATUS REVIEW
Jay L. Chamberlin Jan. 1984 16 p Presented at the EPRI Workshop on Electrochem. of Zinc-Halogen Batteries, Palo Alto, Calif., 30 Nov. 1983
(Contract DE-AC04-76DP-00789)
(DE84-008973; SAND-84-0685C; CONF-8311134-5) Avail: NTIS HC A02/MF A01

The intent was shown that significant programs are underway to develop the zinc/bromine development programs are summarized. The developers are Exxon Research and Engineering Company (Linden, New Jersey), Energy Research Corporation (Danbury, Connecticut) and Gel Incorporated (Durham, North Carolina). Fuel cell efforts are described. DOE

N84-30207# Stanford Linear Accelerator Center, Calif.
RECOMMENDATIONS FOR ON-SITE VIBRATION STANDARDS
G. E. Fischer 16 Jun. 1983 12 p refs
(Contract DE-AC03-76SF-00515)
(DE84-011756; SU-SLAC-CN-236) Avail: NTIS HC A02/MF A01

The luminosity of the Collider which may be adversely affected by otherwise preventable ground vibrations is discussed. It was indicated that ground variations may be caused by the sum of natural and man-made effects, of which the latter can be divided into uncontrollable and controllable. Man-made vibrations are considered. The order of magnitude of amplitudes and frequencies of presently, (on site) known noise polluters is described in relation to naturally occurring disturbances and to the tolerances required for successful Collider operation. Some methods of mitigating the effects of on site machinery are suggested. A vibration tolerance level specification and a mechanism to police adherence to such standards are recommended. DOE

N84-30208# Tennessee Valley Authority, Chattanooga. Div. of Energy.
BATTERY TEST RESULTS ON GOULD GC2-EV200
T. W. Blickwedel and C. G. Hand Aug. 1983 100 p refs
(DE84-900635; TVA/OP/EDT-83/35) Avail: NTIS HC A05/MF A01

The test and evaluation of maintenance free lead acid eV batteries are described. Technology involving a starved electrolyte and semi-sealed construction is presented. At least one test cycle is performed on each module before shipping the modules to Tennessee Valley Authority (TVA) for test and evaluation. DOE

N84-30209# Stanford Linear Accelerator Center, Calif.
ANALYTIC SOLUTION FOR THE PROBLEM OF GRIDDED GAP-ELECTRON FLOW INTERACTION
S. Khifets, S. Yu, and J. Jaeger Jan. 1984 16 p refs
(Contract DE-AC03-76SF-00515)
(DE84-008975; SU-SLAC/AP-13) Avail: NTIS HC A02/MF A01

The modelling of high power klystrons is discussed. One of the basic components of high power Klystron, the resonant cavities were studied. The formulation is not restricted to Klystron modelling, but is applicable to any problem involving the interaction of an electron beam with a resonant cavity. The hydrodynamic models of electron beams used to derive the small signal theories fail when particle trajectories cross each other. A Vlasov description of the electron beam to study the Klystron problem is emphasized. The Vlasov formulation follows the evolution of the electron distribution function in phase space. The general framework can naturally accommodate particle crossing, and the beam dynamics are accurately described even when the signals are large. DOE

N84-30210# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
TRANSPORT PROPERTIES OF CONCENTRATED SOLUTIONS
John Newman Nov. 1983 19 p Presented at the Electric Power Research Inst. Battery Conf., Palo Alto, Calif., 30 Nov. 1983
(Contract DE-AC03-76SF-00098)
(DE84-008495; LBL-17363; CONF-8311134-1) Avail: NTIS HC A02/MF A01

The analysis of mass transport processes in battery systems requires accurate values of the transport properties of electrolytic solutions. A generally valid theory of mass transport is presented and described. Mass transport properties are defined by the theory used to describe the flux of mobile species. A consistent set of transport equations are developed for dilute solutions of electrolytes. This theory breaks down, however, in concentrated solutions. In concentrated solution theory, the migration and diffusion fluxes are defined with respect to an average velocity of the fluid, and the driving force for these fluxes is the electrochemical potential. Unlike dilute solution theory, concentrated solution theory correctly defines the number of transport properties. The measurement of fringe displacements of diffusing solutions in an optical concentration cell is a method of determining diffusion coefficients. This method is described, and results for nitric acid solutions are given. DOE

N84-30211# Sandia Labs., Albuquerque, N. Mex.
LIGHTNING SIMULATOR CIRCUIT PARAMETERS AND PERFORMANCE FOR SEVERE-THREAT, HIGH-ACTION-INTEGRAL TESTING
Robert A. White 1984 14 p refs Presented at the Intern. Conf. on Lightning and Static Elec., Orlando, Fla., 22 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-009065; SAND-83-2254C; CONF-8406100-2) Avail: NTIS HC A02/MF A01

The lightning simulator at Sandia National Laboratories was used to subject a number of DOE and military test items to severe levels of simulated lightning. Some example circuits and circuit parameters are discussed in relation to tests made with this crowbarred Mary-generator type simulator. Examples of fast rising, high peak, long duration simulated lightning currents that were produced into full size test items are presented. Peak currents up to 250 kA with 1-(MU)s rise times and action values up to greater than 6 million A(2)s was injected into various test systems. DOE

N84-30212# Oak Ridge National Lab., Tenn. Atomic, Molecular and High Voltage Physics Group.
NEGATIVE ION FORMATION IN SF6 SPARK BY-PRODUCTS
I. Sauers, L. G. Christophorou, and S. M. Spyrou 1984 13 p refs Presented at the 4th Intern. Symp. on Gaseous Dielect., Knoxville, Tenn., 29 Apr. 1984
(Contract DE-AC05-84OR-21400)
(DE84-012340; CONF-840403-6) Avail: NTIS HC A02/MF A01

When sulfur hexafluoride (SF6) gas is used as electrical insulation (e.g., in high voltage or switching applications), deterioration of the gas caused by sparks, corona, high electrical stress, or high temperature results in a buildup of by-products whose electron attaching properties differ from those of SF6. A number of long lived by-products formed by spark discharges in SF6 at pressures in the range 40 to 233 kPa are identified. The concentrations of the by-products SOF2, So2F2, SO2, SiF4, and SOF4 are measured quantitatively. These by-products are formed via the interaction of the multiplicity of transient short lived species in sparked SF6 with moisture, electrode material, and insulators. Each is studied individually in a time of flight mass spectrometer, and the negative ion yields as a function of electron energy in the range 0 to 12 eV are measured. Cross sections for electron attachment to SO2 are reported and compared with literature data. DOE

N84-30213# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afdeling Technische Menskunde.
SELECTION OF ELEMENTS IN PROCESS SCHEMES ON CATHODE RAY TUBE (CRT). A COMPARATIVE STUDY BETWEEN FOUR TYPES OF TRACKBALLS
J. Vermeulen and J. L. A. Bouchier Feb. 1984 24 p refs In DUTCH; ENGLISH summary
(Contract A79/KM/134)
(IZF-1984-4; TDCK-79067) Avail: NTIS HC A02/MF A01

Trackballs were compared for best task performance and for optimum value of control/display ratio (C/D-ratio). The time to place the cursor on a target and the error rate were used as performance measures. The subjects (six for each trackball) rated the C/D-ratios used according to their preference. Results show that target dimension does not influence the error rate; with increasing target dimension the positioning time decreases. Performance with one of the trackballs differs strongly from that of the others, this trackball being originally selected for a totally different purpose. No differences in positioning time and error rate are demonstrated between the remaining types. An optimum C/D-ratio is defined. Author (ESA)

N84-30214# Physics Lab. RVO-TNO, The Hague (Netherlands). Researchgroep 5: Informatieverwerkende Systemen.
GATE ARRAYS
J. B. M. vanderPeet Feb. 1984 53 p refs In DUTCH; ENGLISH summary
(AD-B082958; PhL-1984-05; TDCK-78986) Avail: NTIS HC A04/MF A01 CSCL 09/3

Gate arrays in integrated circuits, advantages, design procedure, selection criteria, and price are discussed. The most common gate array technologies were surveyed. Criteria for selection of a gate array manufacturer are given. Manufacturers, their products, approach, etc., are discussed. Author (ESA)

N84-30215# European Space Research and Technology Center, Noordwijk (Netherlands). Product Assurance Div.
THE EVALUATION AND APPROVAL OF AUTOMATIC MACHINE WAVE SOLDERING FOR ESA SPACECRAFT HARDWARE
Feb. 1984 27 p refs
(ESA-PSS-01-707; ISSN-0379-4059) Avail: NTIS HC A03/MF A01

Requirements for the evaluation and approval of automatic machine wave soldering for use in ESA spacecraft hardware are specified. The process requirements for wave soldering of double-sided and multilayer boards are also defined. Author (ESA)

N84-30216# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
PREDICTION AND ANALYSIS OF VARIABLE RELUCTANCE STEPMOTOR DRIVE SYSTEMS
D. W. J. Pulle 5 Jan. 1982 196 p refs Sponsored by UK Science and Engineering Research Council
(NLR-TR-81139-U) Avail: NTIS HC A09/MF A01

A relationship between the electric terminal parameters and output/input power is derived for conventional doubly-salient synchronous machines and extended to include the variable reluctance motor. The advantages and limitations of the drive-schemes are shown in Blondel diagrams and torque speed curves. A general method for obtaining a quantitative assessment of drive-schemes is developed by the introduction of so-called performance figures, related to the output power and efficiency. From this method applied to four drive schemes, it is concluded that severe performance degradation is the result of using a forging resistance in a drive-scheme. A forced decay unipolar chopper drive is presented. Author (ESA)

N84-30217# Alabama Univ., Huntsville.
EVALUATION OF A 96V EV 1000 BATTERY PACK AT TEMPERATURE EXTREMES Final Report
Dieter Nowak Aug. 1983 33 p Prepared for Aerospace Corp.
(PB84-187723; UAH-376) Avail: NTIS HC A03/MF A01 CSCL 10C

Tests with a 96V GLOBE EV 1000 battery were conducted to measure the effects of temperature extremes on the performance of EV batteries. The test objectives were to assess the nature and extent of problems encountered at various operating temperatures and to provide the engineering data base for the elimination of the problems. GRA

N84-30218# Alabama Univ., Huntsville. Environmental and Energy Center.
EVALUATION OF 96V EXIDE EPV23-3 BATTERY PACK AT TEMPERATURE EXTREMES Final Report
D. Nowak Apr. 1983 59 p refs Sponsored by Aerospace Corp.
(PB84-187749; UAH-367) Avail: NTIS HC A04/MF A01 CSCL 10C

Tests with a 96V Exide XPV23-3 battery were conducted to measure the effects of temperature extremes on the performance of electric vehicle batteries. The test objectives were to assess the nature and extent of problems encountered at various operating temperatures and to provide the engineering data base for the elimination of the problems. Author (GRA)

N84-30219# Alabama Univ., Huntsville. Environmental and Energy Center.
EVALUATION OF AN 96V ALCO 2200 BATTERY PACK AT TEMPERATURE EXTREMES Final Report
Dieter Nowak Jun. 1983 34 p Sponsored by DOE and Aerospace Corp.
(PB84-187731; UAH-368) Avail: NTIS HC A03/MF A01 CSCL 10C

Tests with a 96 V ALCO 2200 battery were conducted to measure the effects of temperature extremes on the performance of EV batteries. The test objectives were to assess the nature and extent of problems encountered at various operating temperatures and to provide the engineering data base for the elimination of the problem. GRA

N84-30876# Joint Publications Research Service, Arlington, Va.
HIGH-Q OPEN RESONATOR STRUCTURES WITH SPARSE SPECTRUM Abstract Only
A. A. Kurayev, Ye. I. Nefedov, A. Ya. Slepyan, and G. Ya. Slepyan *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 13 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, no. 1, Sep. 1983 p 94-97 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N84-30220 British Library Lending Div., Boston Spa (England).
INVARIANCE OF LEVEL OF ROTATING LIQUID
V. P. Komysmev and V. A. Zelenetskii 26 Apr. 1984 2 p Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chem. Met. (USSR),

v. 8, 1983
(BLL-M-35611-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Conditions under which constancy of the level of a rotated liquid is insured were investigated. Calculation and experiment show that the level remains constant for a circle of a set radius within certain speeds of rotation. Author

N84-30221 United Kingdom Atomic Energy Authority, Dorchester (England).
[NON-INERTIAL FLOW OF DILUTE POLYMER SOLUTIONS IN A SUDDEN CONTRACTION]
27 Jan. 1984 6 p Transl. into ENGLISH from Fluid Mech. (Paris), series 2, 3 May 1982 p 927-932
(BLL-WH-558-(909A.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Non-inertial flow of dilute polymer solutions in a sudden contraction was examined to interpret clearly the extensional-thickening behavior of the solutions. Experimental conditions were reviewed, and the velocity field and axial extensional velocities were discussed. A linear hydrolyzed polyacrylamid (HPAM) was dissolved in a Newtonian fluid to make the polymer solution. The velocities were measured with a laser Doppler velocimeter. R.S.F.

N84-30222*# National Aeronautics and Space Administration, Washington, D. C.
CALCULATION OF THE STATISTICAL CHARACTERISTICS OF SURFACE
T. N. Krasilnikova and Yu. G. Gurevich, ed. May 1984 11 p refs Transl. into ENGLISH of "Raschet Statisticheskikh Kharakteristik Pulsatsiy Davleniya na Poverkhnosti po Vtorym Momentam Prodolnykh Puldatsiy Skorosti v Pogranichnom Sloye" Moscow, Nauka Press, 1970 p 44-49 Presented at Turbulent Flows: All-Union Symp. on Probl. of Turbulent Flows Including Geophys. Appl., Kiev, 16-21 Jun. 1967 Document previously announced as A71-15607 pressure pulsations from the second moments of longitudinal pulsations in the boundary layer Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77462; NAS 1.15:77462) Avail: NTIS HC A02/MF A01 CSCL 20D

The statistical characteristics of the pulsation pressure on a surface in a turbulent boundary layer of incompressible fluid were determined. For a turbulent boundary layer of incompressible fluid in the immediate vicinity of a smooth flat wall, it is shown that a simple relation exists between the surface pulsation pressure and the velocity pulsations in the boundary layer. Author

N84-30223*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ATOMIZATION OF LIQUID SHEETS IN HIGH PRESSURE AIRFLOW
Robert D. Ingebo 1984 18 p refs Proposed for presentation at the Winter Ann. Meeting of the American Society of Mechanical Engineers, New Orleans, 9-14 Dec. 1984
(NASA-TM-83731; E-2207; NAS 1.15:83731) Avail: NTIS HC A02/MF A01 CSCL 20D

An investigation of liquid sheet atomization is made with combustor simulated inlet air pressures varied from 0.10 to 2.1 MPa. Mean drop diameters are measured with an improved scanning radiometer and correlated with the liquid and air stream Reynolds numbers, RE(1) and RE(A) and the airstream pressure sensitive group GC(2). These data are used in the modeling of the combustion process. M.A.C.

N84-30224*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ACOUSTIC PRESSURES EMANATING FROM A TURBOMACHINE STAGE
Sridhar M. Ramachandra 1984 16 p refs Proposed for presentation at the 9th Aeroacoustics Meeting, Williamsburg, Va., 15-17 Oct. 1984; sponosred by NASA and the American Inst. of Aeronautics and Astronautics
(NASA-TM-83734; E-2217; NAS 1.15:83734) Avail: NTIS HC A02/MF A01 CSCL 20D

A knowledge of the acoustic energy emission of each blade row of a turbomachine is useful for estimating the overall noise level of the machine and for determining its discrete frequency noise content. Because of the close spacing between the rotor and stator of a compressor stage, the strong aerodynamic interactions between them have to be included in obtaining the resultant flow field. A three dimensional theory for determining the discrete frequency noise content of an axial compressor consisting of a rotor and a stator each with a finite number of blades are outlined. The lifting surface theory and the linearized equation of an ideal, nonsteady compressible fluid motion are used for thin blades of arbitrary cross section. The combined pressure field at a point of the fluid is constructed by linear addition of the rotor and stator solutions together with an interference factor obtained by matching them for net zero vorticity behind the stage. Author

N84-30225*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
VISCOUS COMPUTATION OF A SPACE SHUTTLE FLOW FIELD
Denny S. Chaussee, Yehia M. Rizk (Informatics General Corp.), and Pieter G. Buning Jun. 1984 9 p refs
(NASA-TM-85977; A-9799; NAS 1.15:85977) Avail: NTIS HC A02/MF A01 CSCL 20D

A procedure is presented, as well as some results, to calculate the flow over the winged orbiter. This necessitates the use of two computer codes. A parabolized marching Navier-Stokes code is used to obtain the solution up to the bow shock-wing shock interaction region and for the region after the interaction. An unsteady Navier-Stokes code is to be used in the region of the shock interaction. Only resuls for the marching code are presented. For the flow conditions calculated, M infinity = 7.9, alpha = 25 deg, T(wall) = 540 R, Re(L) = 60728 per inch, laminar or turbulent, the PNS code was marched up to an X/L = 0.7 which is where the bow shock-wing shock interaction region occurs. Author

N84-30226*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
He-3 COOLING SYSTEMS FOR SPACE Status Report
Peter Kittel Jul. 1984 15 p refs
(NASA-TM-85985; A-9821; NAS 1.15:85985) Avail: NTIS HC A02/MF A01 CSCL 20D

The development of a space-compatible He(3) refrigerator would provide a significant improvement in several areas of research in the 0.3 to 1 K temperature range. There are several methods of achieving these temperatures on Earth: He(3) refrigeration, dilution refrigeration, and adiabatic demagnetization refrigeration. The progress of adapting He(3) refrigeration for use in space is described. Various cycles and possible embodiments of He(3) refrigerators are described. Also included is an analysis of the liquid confinement and liquid-vapor phase-separation system. A possible configuration is then analyzed. Finally, the results of ground-based experiments will be discussed. Author

N84-30227# Mississippi State Univ., Mississippi State. Engineering Industrial Research Station
GENERALIZED ROUGHNESS EFFECTS ON TURBULENT BOUNDARY LAYER HEAT TRANSFER. A DISCRETE ELEMENT PREDICTIVE APPROACH FOR TURBULENT FLOW OVER ROUGH SURFACES Final Report, Nov. 1981 - Sep. 1983
H. W. Coleman, B. K. Hodge, and R. P. Taylor Eglin AFB, Fla. Air Force Armament Lab. Nov. 1983 139 p
(Contract F08635-82-K-0062)
(AD-A141943; AD-E800940; MSSU-TFD-84-1; AFATL-TR-83-90) Avail: NTIS HC A07/MF A01 CSCL 20/4

A discrete element model for turbulent flow over rough surfaces has been rigorously derived from basic principles. This model includes surface roughness effects as a constituent part of the partial differential equations which describe momentum and energy transport in turbulent flows. The model includes the necessary empirical information on the interaction between the roughness elements and the flow around and between the elements in a general way which does not require experimental data on each specific surface. This empirical information is input via algebraic models for the local element drag coefficient and Nusselt number. These models have been calibrated by comparison with base data sets from surfaces with three-dimensional (distributed) roughness elements. Calculations using the present discrete element model are compared with experimental data from 118 separate experimental runs. The results of these comparisons range from good to excellent. The calculations are shown to compare equally well with both transitionally rough turbulent flow and fully rough turbulent flow without modification of the roughness model. In the course of the present work it was discovered that the definitive data set of Schlichting is flawed. Corrected values are presented for this data set. GRA

N84-30228# Science Applications, Inc., McLean, Va.
ENERGY RELEASE AND FLUID DYNAMICS IN MULTIPHASE SYSTEMS Final Report
K. Kailasanath 18 Apr. 1984 120 p
(Contract N00014-82-C-2037)
(AD-A142402; SAI-84/1093) Avail: NTIS HC A06/MF A01 CSCL 20/4

In the following discussion we will summarize the work performed by Science Applications, Inc. (SAI) on 'Energy Release and Fluid Dynamics in Multiphase Systems' during the technical performance period ending February 1984. During this contract period, our attention was focussed primarily on: (1) studying the structure and propagation of multidimensional detonations, and (2) shock initiation of detonations with an emphasis on power-energy relations. The efforts and accomplishments in each of these areas is described below in some detail. GRA

N84-30229# Pennsylvania State Univ., University Park. Applied Research Lab.
EFFECT OF TURBULENT BOUNDARY LAYER FLOW ON MEASUREMENT OF ACOUSTIC PRESSURE AND INTENSITY, REVISED
G. C. Lauchle 18 May 1984 41 p
(Contract N00024-79-C-6043)
(AD-A142473; ARL/PSU/TM-84-87-Rev) Avail: NTIS HC A03/MF A01 CSCL 20/4

Acoustic measurements performed with pressure sensors (microphones and hydrophones) can be subject to misinterpretation if the sensors are in contact with a turbulent boundary layer flow. This misinterpretation is a result of non-propagating pressure fields (flow noise) generated by the turbulent motions of the fluid. In this paper, a simple analysis is given whereby the flow noise response of a pressure sensor placed in a turbulent boundary layer flow can be estimated. If the purpose of the sensor is to measure the sound emitted from an independent source outside of the turbulent boundary layer, then a bias for the measurement can be calculated. A bias formula for intensity measurements made with two-sensors under a turbulent boundary layer is also derived under the assumption of a very low Mach number flow. Author (GRA)

N84-30230# Naval Research Lab., Washington, D. C.
NUMERICAL SIMULATIONS OF THE STRUCTURE AND PROPAGATION OF SELF-SUSTAINED DETONATIONS
K. Kailasanath, E. S. Oran, J. P. Boris, and T. R. Young 21 Jun. 1984 23 p
(RR0-1306)
(AD-A142486; NRL-MR-5380) Avail: NTIS HC A02/MF A01 CSCL 19/4

Two-dimensional time-dependent numerical simulations have been performed to determine a computational method of determining the natural cell size of a self-sustained detonation. The systematic approach developed involves simulating systems with tube heights both larger and smaller than the transverse cell spacing. This approach, tested on a mixture of hydrogen, oxygen and argon, provided us with an estimate of the cell size which is in excellent agreement with experimental observations. The simulations also provided insight into some aspects of the mechanism by which a self-sustained detonation propagates. The evolution of the curvature of the transverse wave appears to be the crucial feature. Depending on the curvature of the transverse wave at the time of its reflections from either a neighboring transverse wave or a wall, the cell is either flattened or pockets of unreacted gas can be formed. Author (GRA)

N84-30231# Naval Ship Research and Development Center, Bethesda, Md. Aviation and Surface Effects Dept.
AN INTEGRAL PREDICTION METHOD FOR THREE-DIMENSIONAL FLOW SEPARATION Technical Report, Oct. 1982 - Dec. 1983
T. C. Tai May 1984 16 p
(ZR0-230)
(AD-A142551; AERO-1292; DTNSRDC-84/034) Avail: NTIS HC A02/MF A01 CSCL 20/4

A three-dimensional integral boundary-layer approach is developed and coupled with the streamline method for theoretically determining the vortex-type flow separation. The governing equations are solved in a streamwise system using a power-law profile for the streamwise flow and the Mager profile for the crossflow. The reduced ordinary system is then coupled with the streamline equation and integrated using the fourth-order Runge-Kutta scheme. Crossflow derivatives are evaluated and accounted for during the integration. A prolate spheroid at incidence in an incompressible turbulent flow is considered as a test case. Good comparison between the theory and the experiment has been observed for the case of alpha = 10 degrees. For the case of high incidence, the method predicts a qualitative trend but deviates quantitatively due to the large crossflow involved. Author (GRA)

N84-30232# Miami Univ., Coral Gables, Fla.
NUMERICAL AND ANALYTICAL STUDIES OF STEADY DETONATION WAVES WITH EXPANSION LOSSES Final Report, 1 Jul. 1982 - 14 Dec. 1983
M. A. Huerta 6 Feb. 1984 24 p
(Grant AF-AFOSR-0241-82)
(AD-A142601; AFOSR-84-0160TR) Avail: NTIS HC A02/MF A01 CSCL 19/4

The differential equations for the evolution of the fluid quantities in steady detonation waves are integrated numerically using a fourth order Runge-Kutta-Fehlberg method. Strong and Weak detonation waves are found as well as detonation failure. In the weak regime there is a continuum of propagation speeds for a given expansion loss. GRA

N84-30233# Naval Postgraduate School, Monterey, Calif.
SURFACE DISTURBANCES DUE TO TRAILING VORTICES Progress Report, 30 Dec. 1983 - 30 Mar. 1984
T. Sarpkaya and D. O. Henderson, Jr. Mar. 1984 159 p
(ARPA Order 3925)
(AD-A142693; NPS69-84-004) Avail: NTIS HC A08/MF A01 CSCL 20/4

The characteristics of the surface signatures resulting from the interaction of the trailing vortices with the free surface have been investigated both theoretically and experimentally. The vortices were created through the use of three lifting surfaces of different shape and aspect ratio (two Delta wings and a rectangular foil). The surface disturbances have been classified into two groups (striations and scars) and the evolution of each type has been expressed in terms of the governing parameters such as the depth of generation of vortices, mutual induction velocity, and the initial vortex spacing. It has been shown that the surface signatures are a consequence of the strain field resulting from the nonuniform surface-velocity distribution and that they are not simple capillary-gravity waves. A turbulence model has been used to establish reasonable correlation between the theoretical and experimental results. Author (GRA)

N84-30234# Colorado State Univ., Fort Collins. Solar Energy Applications Lab.

OPEN CYCLE LITHIUM CHLORIDE COOLING SYSTEM Final Report, 1 Mar. 1982 - 28 May 1983

Terry G. Lenz, George O. G. Loef, Ravi Iyer, and Jarrell Wenger May 1983 66 p refs
(Contract DE-AC03-81CS-30569)
(DE84-005831; DOE/CS-30569/29) Avail: NTIS HC A04/MF A01

A lithium chloride open cycle absorption chiller has been designed, built and tested. Solution reconcentration takes place in a small counter current packed column supplied with solar heated air. Removal of noncondensable gases that enter the chiller dissolved in the strong solution and the make-up refrigerant streams is accomplished by a liquid-jet ejector and a small vacuum pump. Cooling capacities approaching 1.4 tons and COP levels of 0.58 have been achieved at non-optimum operating conditions. Test results from preliminary system operation suggest that mass transfer processes in both the packed column reconcentrator and the absorber are controlled by concentration gradients in the lithium chloride solution. Liquid phase controlled mass transfer dictates an operating strategy different from the previously assumed gas phase controlled process to obtain maximum rates of evaporation in the packed column. Determination of optimal operating conditions leading to decreased electrical power consumption and improved cooling capacity and coefficient of performance will require further analysis and testing. DOE

N84-30235# Los Alamos Scientific Lab., N. Mex.

ELECTRON VELOCITY DISTRIBUTIONS NEAR COLLISIONLESS SHOCKS

W. C. Feldman 1984 40 p refs Presented at Chapman Conf. on Collisionless Shock Waves in the Heliosphere, Napa Valley, Calif., 20 Feb. 1984
(Contract W-7405-eng-36)
(DE84-011352; LA-UR-84-1199; CONF-840256-3) Avail: NTIS HC A03/MF A01

Recent studies of the amount of electron heating and of the shapes of electron velocity distributions across shocks near the Earth are reviewed. Electron heating increases with increasing shock strength but is always less than the ion heating. The scale length of electron heating is also less than that for the ions. Electron velocity distributions show characteristic shapes which depend on the strength of the shocks. At the weaker shocks, electron heating is mostly perpendicular to the ambient magnetic field, bar B, and results in Gaussian-shaped velocity distributions at low-to-moderate energies. At the stronger shocks, parallel heating predominates resulting in flat-topped velocity distributions. A reasonable interpretation of these results indicates that at the weaker shocks electron heating is dominated by a tendency toward conservation of the magnetic moment. At the stronger fast-mode shocks, this heating is thought to be dominated by an acceleration parallel to bar B produced by the macroscopic shock electric field followed by beam driven plasma instabilities. DOE

N84-30236# Argonne National Lab., Ill. Components Technology Div.

THERMAL LAMINARIZATION OF A STRATIFIED PIPE FLOW

J. J. Oras and K. E. Kasza 1984 8 p refs Presented at the Ann. Meeting of the American Nuclear Society, New Orleans, 3 Jun. 1984
(Contract W-31-109-eng-38)
(DE84-006407; CONF-840614-22) Avail: NTIS HC A02/MF A01

The propensity for pipe stratification to occur in the reactor outlet nozzles and hot leg piping of a generic LMFBR during events producing reverse pipe flow are determined. The role that thermal buoyancy plays relative to being able to laminarize a turbulent stratified shear zone in a horizontal pipe is examined. The preceeding can influence the behavior of a pipe stratified backflow recirculation zone (cold plenum water down into the hot pipe flow) which develops as the result of a temperature difference between the pipe flow and the plenum. DOE

N84-30237# Argonne National Lab., Ill.

EXPERIMENTS ON TUBES CONVEYING FLUID

J. A. Jendrezjczyk and S. S. Chen 1984 34 p refs Presented at ASME Pressure Vessel and Piping Conf., San Antonio, 17 Jun. 1984
(Contract W-31-109-eng-38)
(DE84-004031; CONF-840647-1) Avail: NTIS HC A03/MF A01

Tests are conducted for tubes conveying fluid for six types of support conditions. The objectives are to understand the dynamic characteristics of such systems for different support conditions and to examine the transition from one instability mechanism to another. DOE

N84-30238# Argonne National Lab., Ill.

NUMERICAL TREATMENT OF PIPE BOUNDARY CONDITIONS IN TWO-PHASE FLOW

W. C. Sha and E. M. Gelbard 3 Jun. 1984 7 p refs Presented at Ann. Meeting of the Am. Nucl. Soc., New Orleans, 3 Jun. 1984
(Contract W-31-109-eng-38)
(DE84-006553; CONF-840614-31) Avail: NTIS HC A02/MF A01

Numerical treatment of two-phase flow n pipes seems to involve difficulties still not totally resolved. These difficulties are discussed for a simple two-fluid model, with no terms added to make characteristics real. DOE

N84-30239# Westinghouse Research and Development Center, Pittsburgh, Pa.

ADVANCED ELECTRIC HEAT PUMP DUAL-STROKE COMPRESSOR AND SYSTEM DEVELOPMENT Final Report

S. E. Veyo and T. J. Fagan Dec. 1983 190 p refs
(Contract W-7405-eng-26)
(DE84-007916; ORNL-Sub-79-24712/3) Avail: NTIS HC A09/MF A01

The development of an advanced electric heat pump is discussed. A two-capacity, residential, advanced electric heat pump utilizing a unique dual-stroke compressor was developed. Two nearly identical preprototype split systems of nominally 3.5 tons maximum cooling capacity were designed, built and laboratory tested. The estimated annual energy efficiency of this advanced system is 20 percent better than a two-speed electric heat pump available at contract inception in 1979. This superior performance is due to the synergism of a high-efficiency, dual-stroke reciprocating compressor, a dual-strength high-efficiency single-speed single-phase hermetic drive motor, a single-width, single-entry high-efficiency indoor blower with backward curved cambered plate blades, a high-efficiency multivane axial flow outdoor fan, high-efficiency two-speed air mover motors and a microprocessor control system. The relative proportions of heat exchangers, air flows and compressor size as well as the ratio between high and low capacity were optimized so as to minimize the annual cost of ownership in a northern climate. Constraints placed upon the optimization and design process to ensure comfort provide heating air with a temperature of at least 90(0)F and provide cooling with a sensible-to-total capacity ratio of not more than 0.7. System performance was measured in the laboratory in accordance with applicable codes and procedures. Performance data plus hardware details are provided. DOE

N84-30240# Argonne National Lab., Ill.

STABILITY OF TUBES CONVEYING FLUID

S. S. Chen and J. A. Jenrejczyk Apr. 1984 46 p refs
(Contract W-31-109-eng-38)
(DE84-010573; ANL-84-5) Avail: NTIS HC A03/MF A01

Tests and analysis are made for tubes conveying fluid for two years of support conditions. The characteristics of different types of instability, the transition of one instability mechanism to another, and the control of instability are studied. DOE

N84-30241# California Univ., Berkeley. Dept. of Materials Science and Mineral Engineering.

DIFFUSION OF GASES IN POROUS SOLIDS: SIMULATIONS AND MEASUREMENTS Quarterly Report, 16 Jan. - 15 Apr. 1984

J. W. Evans Apr. 1984 6 p
(Contract DE-FG22-82PC-50796)
(DE84-010822; DOE/PC-50796/T5; QR-7) Avail: NTIS
HC A02/MF A01

The diffusion of a gas in a porous solid is analogous to two other classical problems: the conduction of heat in a two phase medium, one phase being insulating, and the conduction of electricity in a two phase medium one phase of which does not conduct. An example of the latter would be the problem of predicting the resistance of an electrolyte containing gas bubbles given the resistivity of the electrolyte alone and information on the gas bubbles. This problem was examined theoretically by both Maxwell and Bruggeman who provided equations that predict the variation of the effective resistivity (or its inverse, the effective conductivity) versus the volume fraction of bubbles. This analogy appears to have been left unrecognized and unexploited by investigators concerned with predicting diffusion rates in porous solids. It enables the prediction to be made using the Maxwell or Bruggeman equations. Conversely the Monte Carlo simulations of gaseous diffusion in porous solids being carried out at Berkeley should yield predictions of the effective conductivity of electrolytes containing gas bubbles. Some results from the new algorithm for predicting gaseous diffusion rates are compared to the predictions of the Bruggeman and Maxwell equations. DOE

N84-30242# Department of Energy, Washington, D. C.

MANIPULATOR HAVING THERMALLY CONDUCTIVE ROTARY JOINT FOR TRANSFERRING HEAT FROM A TEST SPECIMEN Patent Application

Steven J. Haney, Richard H. Stulen, and Norman F. Toly, inventors (to DOE) Filed 3 May 1983 18 p
(Contract DE-AC04-76DP-00789)
(DE84-010958; US-Patent-Appl-SN-491134) Avail: .NTIS
HC A02/MF A01

A manipulator for rotatably moving a test specimen in an ultrahigh vacuum chamber includes a translational unit movable in three mutually perpendicular directions. A manipulator frame is rigidly secured to the translational unit for rotatably supporting a rotary shaft. A first copper disc is rigidly secured to an end of the rotary shaft for rotary movement within the vacuum chamber. A second copper disc is supported upon the first disc. The second disc receives a cryogenic cold head and does not rotate with the first disc. A sapphire plate is interposed between the first and second discs to prevent galling of the copper material while maintaining high thermal conductivity between the first and second discs. A spring is disposed on the shaft to urge the second disc toward the first disc and comprehensively engage the interposed sapphire plate. A specimen mount is secured to the first disc for rotation within the vacuum chamber. The specimen maintains high thermal conductivity with the second disc receiving the cryogenic transfer line. DOE

N84-30243# Department of Energy, Washington, D. C.

SHOCK WAVE ABSORBER HAVING A DEFORMABLE LINER Patent Application

Carl K. Youngdahl, Arne H. Wiedermann, Yong W. Shin, Christian A. Kot, and Carl E. Ockert, inventors (to DOE) Filed 26 Aug. 1983 18 p
(Contract W-31-109-eng-38)
(DE84-011306; US-Patent-Appl-SN-526767) Avail: NTIS
HC A02/MF A01

This invention discloses a shock wave absorber for a piping system carrying liquid. The absorber has a plastically deformable liner defining the normal flow boundary for an axial segment of the piping system, and a nondeformable housing is spaced outwardly from the liner so as to define a gas tight space therebetween. The flow capacity of the liner generally corresponds to the flow capacity of the piping system line, but the liner has a noncircular cross section and extends axially of the piping system line a distance between one and twenty times the diameter thereof. Gas pressurizes the gas tight space equal to the normal liquid pressure in the piping system. The liner has sufficient structural capacity to withstand between one and one half and two times this normal liquid pressure; but at greater pressures it begins to plastically deform initially with respect to shape to a more circular cross section, and then with respect to material extension by circumferentially stretching the wall of the liner. A high energy shock wave passing through the liner thus plastically deforms the liner radially into the gas space and progressively also as needed in the axial direction of the shock wave to minimize transmission of the shock wave beyond the absorber. DOE

N84-30244# California Univ., Livermore. Lawrence Livermore Lab.

APPLICATION OF MOLECULAR DYNAMICS TO MACROSCOPIC PARTICLES

Otis R. Walton Jan. 1984 13 p refs Presented at the Workshop on Media with Microstruct. and Wave Propagation, Houghton, Mich., 24-25 Jan. 1983
(Contract W-7405-eng-48)
(DE84-011066; UCRL-90234; CONF-830141-5) Avail: NTIS
HC A02/MF A01

Molecular dynamics research is reviewed with emphasis on current nonequilibrium calculational techniques used to calculate transport coefficients in systems of polyatomic molecules. Many of the numerical methods and numerical experiment evaluation techniques of that field could be adapted to macroscopic granular material studies. Macroscopic particles interact with nonconservative interaction forces. Macroscopically available energy is lost from the system during most dynamic interactions - through plastic deformation, friction and breakage. Two-dimensional models are used in a study of nonequilibrium shearin flow of granular materials. Several verification calculations and tests confirm the ability of these computer models to predict the dynamic interactions of macroscopic particles. Preliminary results from shearing flow calculations and corresponding laboratory tests are also in qualitative agreement. DOE

N84-30245# Los Alamos Scientific Lab., N. Mex.

DUST PARTICLES IN HIGH SPEED FLOWS: CALCULATIONS OF SMALL PARTICLE REENTRY HYDRODYNAMICS

Maxwell T. Sandford, II Feb. 1984 18 p refs
(Contract W-7405-eng-36)
(DE84-010998; LA-10025) Avail: NTIS HC A02/MF A01

Numerical hydrodynamic calculations are used to model the dispersion of dust injected into a supersonic flow by the explosive disruption of a reentry vehicle. The particles constitute an initial dustball that expands into the existing velocity field after the detonation. Dust grains subsequently form a plume along the vehicle path. Particles in the bow, shock heat to the vaporization temperature because of drag and radiative heating, but particles in the dustball are shielded and consequently suffer only a small amount of vaporization. About 20% of the initial dust mass is vaporized. Application of the results to dust grains entrained in the air blast of a near surface nuclear explosion is briefly considered. DOE

N84-30246# Stanford Univ., Calif. Petroleum Research Inst.

FLOW OF FOAM THROUGH POROUS MEDIA

Owete S. Owete and William E. Brigham Jun. 1984 124 p refs
(Contract DE-AC03-81SF-11564)
(DE84-012410; DOE/SF-11564/6; SU-PRI-TR-37) Avail: NTIS
HC A06/MF A01

The pore level behavior of foam in porous media is investigated. Air is injected into porous micromodels filled with an aqueous solution of surfactant. Three homogenous models of different pore dimensions and one heterogeneous model are used. Visual observations are made to determine the flow characteristics of foam under varying air injection rates, pore dimensions and surfactant concentration. Foam flow mechanisms, as observed in the micromodels, are recorded on video tapes. The mechanisms are classified into membrane and foam bubble propagation. Propagation of membranes, air liquid interfaces, occurs in the homogeneous porous media at both low and high surfactant concentrations, and in the heterogeneous model at low surfactant concentration. Foam bubble propagation occurs only in the heterogeneous model at high surfactant concentrations. A considerable reduction of effective mobility is observed in the presence of foam, compared to air water systems without surfactant. DOE

N84-30247# California Univ., Livermore. Lawrence Livermore Lab. Methods Development Group.
TOPAZ: A FINITE ELEMENT HEAT CONDUCTION CODE FOR ANALYZING 2-D SOLIDS
Arthur B. Shapiro Mar. 1984 92 p refs
(Contract W-7405-eng-48)
(DE84-010676; UCID-20045) Avail: NTIS HC A05/MF A01

The TOPAZ is a two dimensional implicit finite element computer code for heat conduction analysis. A user's manual for TOPAZ and a description of the numerical algorithms used is presented. Sample problems with analytical solutions are created. The TOPAZ has been implemented on the CRAY and VAX computers. DOE

N84-30248# Los Alamos Scientific Lab., N. Mex.
HEAT PIPE TECHNOLOGY ISSUES
M. A. Merrigan Apr. 1984 29 p refs Presented at the 1st Symp. on Space Nucl. Power Systems, Albuquerque, N. Mex., 11-13 Jan. 1984
(Contract W-7405-eng-36)
(DE84-011384; LA-UR-84-1238; CONF-840113-8) Avail: NTIS HC A03/MF A01

Critical high temperature, high power applications in space nuclear power designs are near the current state of the art of heat pipe technology in terms of power density, operating temperature, and lifetime. Recent heat pipe development work at Los Alamos National Laboratory involved performance testing of typical space reactor heat pipe designs to power levels in excess of 19 kW/cm(2) axially and 300 W/cm(2) radially at temperatures in the 1400 to 1500 K range. Operation at conditions in the 10 kW/cm(2) range was sustained for periods of up to 1000 hours without evidence of performance degradation. The effective length for heat transport in these heat pipes was from 1.0 to 1.5 M. Materials used were molybdenum alloys with lithium employed as the heat pipe operating fluid. Shorter, somewhat lower power, molybdenum heat pipes were life tested at Los Alamos for periods of greater than 25,000 hours at 1700 K with lithium and 20, 000 hours at 1500(0) K with sodium. These life test demonstrations and the attendant performance limit investigations provide an experimental basis for heat pipe application in space reactor design and represent the current state-of-the-art of high temperature heat pipe technology. DOE

N84-30249# Argonne National Lab., Ill.
FLOW INDUCED VIBRATION PROGRAM AT ARGONNE NATIONAL LABORATORY
Jan. 1984 45 p refs
(Contract W-31-109-eng-38)
(DE84-009233; ANL-CT/VA-2349) Avail: NTIS HC A03/MF A01

The Argonne National Laboratory's Flow Induced Vibration Program, currently residing in the Laboratory's Components Technology Division is discussed. Throughout its existence, the overall objective of the program was to develop and apply new and/or improved methods of analysis and testing for the design evaluation of nuclear reactor plant components and heat exchange equipment from the standpoint of flow induced vibration. Historically, the majority of the program activities were funded by the US Atomic Energy Commission, the Energy Research and Development Administration, and the Department of Energy. Current DOE funding is from the Breeder Mechanical Component Development Division, Office of Breeder Technology Projects; Energy Conversion and Utilization Technology Program, Office of Energy Systems Research; and Division of Engineering, Mathematical and Geosciences, office of Basic Energy Sciences. Testing of Clinch River Breeder Reactor upper plenum components was funded by the Clinch River Breeder Reactor Plant Project Office. Work was also performed under contract with Foster Wheeler, General Electric, Duke Power Company, US Nuclear Regulatory Commission, and Westinghouse. DOE

N84-30250# Pacific Northwest Lab., Richland, Wash.
INFIL1D: A QUASI-ANALYTICAL MODEL FOR SIMULATING ONE-DIMENSIONAL, CONSTANT FLUX INFILTRATION
C. S. Simmons and T. J. McKeon Apr. 1984 40 p refs
(Contract DE-AC06-76RL-01830)
(DE84-008905; PNL-4945) Avail: NTIS HC A03/MF A01

The program INFIL1D is designed to calculate approximate wetting front advance into an unsaturated, uniformly moist, homogeneous soil profile, under constant surface flux conditions. The code is based on a quasi-analytical method, which utilizes an assumed invariant functional relationship between reduced (normalized) flu and water content. The code uses general hydraulic property data in tabular form to simulate constant surface flux infiltration. DOE

N84-30251# Amoco Oil Co., Naperville, Ill. Research and Development Dept.
STUDY OF EBULLATED BED FLUID DYNAMICS Final Progress Report, Sep. 1980 - Jul. 1983
R. J. Schaefer, D. N. Rundell, and J. K. Shou Jul. 1983 352 p refs
(Contract DE-AC22-80PC-30026)
(DE84-010230; DOE/PC-30026/T5) Avail: NTIS HC A16/MF A01

The fluid dynamics occurring in a coal liquefaction reactor is measured and compared with cold flow fluidization results. Catalyst bed expansions and gas holdups are higher in the Process Development Unit (PDU) than those observed in the cold flow tests for slurries having the same nominal viscosity. Comparison of PDU results with cold flow results shows that the bulk of the operating reactor gas flow lies in the ideal bubbly regime. Existence of churn turbulent behavior during these two experiments is consistent with trends observed in earlier cold flow experiments. Two and three phase fluidization experiments are carried out. Bed expansion is primarily a function of slurry velocity, with gas velocity having only a weak effect. A viscometer is adapted for measurement of the viscosity of coal slurries at high temperature and pressure. A significant degree of backmixing occurs in the H-Coal system. DOE

N84-30252# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Stroemung und Verbrennung.
OPTIMIZATION OF A NUMERICAL METHOD TO CALCULATE ELLIPTIC FLOWS
A. Wilhelm Neuberger Mar. 1984 38 p refs Report will also be announced as translation (ESA-TT-889)
(DFVLR-FB-84-16; ESA-TT-889) Avail: NTIS HC A03/MF A01; DRVLR, Cologne DM 14,50

A local relaxation method for the numerical simulation of elliptic flows was derived. Elliptic flows are steady state turbulent flows with recirculating zones whose mathematical description leads to second order partial differential equations of the elliptic type. The numerical calculation methods for such flows belong to the class of finite volume methods. They lead to a system of algebraic equations iteratively solved by relaxation. A local relaxation method is derived providing strongly improved stability and convergence properties of the iterative process. Author (ESA)

N84-30253# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
GRID-SIZE REDUCTION IN FLOW CALCULATIONS ON INFINITE DOMAINS BY HIGHER-ORDER FAR-FIELD ASYMPTOTICS IN NUMERICAL BOUNDARY CONDITIONS
F. W. Wubs, J. W. Boerstoel, and A. J. vanderWees 16 May 1983 32 p refs Submitted for publication
(NLR-MP-83029-U) Avail: NTIS HC A03/MF A01

An error analysis of the numerical calculation of the steady flow on an infinite domain around a given airfoil by a domain-splitting (= zonal) method is presented. This method combines a fully conservative finite-difference approximation on a finite domain around the airfoil with an approximate asymptotic solution outside this finite domain. The errors are analyzed as a function of the accuracy of the approximate asymptotic expansion, of the distance to the airfoil of the far-field boundary of the finite domain, and of the mesh size. The numerical experiments show that, for a given desired accuracy level, large reductions in grid size are possible, if the usual far field asymptotic approximation is augmented by only a few extra terms in the approximate asymptotic far field solution. Author (ESA)

N84-30254# Kema (N. V.), Arnhem (Netherlands). Dept. of Technological Development.
RESONANCE IN THE WATER CIRCUIT OF A COOLING TOWER
E. vandeSande, A. P. Belde, B. J. G. Hamer, and G. A. Provoost (Delft Hydraulics Lab.) 1983 10 p refs Presented at 4th Pressure Surges Conf., Bath, England, 1983
(S/T-Rept-Vol-1-No-2; B8464515; ISBN-90-353-0006-8; ISSN-0167-8590) Avail: NTIS HC A02/MF A01

Hydraulic resonance during the start up tests of a power station cooling tower circuit was investigated with a mathematical model. The elastic behavior of leaking non return valves appeared to be responsible for the onset of the resonance. The preventive function of a by pass around each valve, was analyzed. Leakage flow was eliminated and a by pass was installed for safety reasons. The measures prove satisfactory for all operating conditions. Author (ESA)

N84-30255# Imperial Coll. of Science and Technology, London (England). Computation Fluid Dynamics Unit.
PROGRESS IN THE DEVELOPMENT OF AN INTERMITTENCY MODEL OF TURBULENCE
M. R. Malin Oct. 1983 74 p refs
(CFD/83/7) Avail: NTIS HC A04/MF A01

Applying an intermittency model of turbulence to the prediction of free turbulent shear flows is described. Numerical solutions of the model equations for self-preserving plane and axisymmetric jets and for the asymptotic plane wake behind a circular cylinder are presented. The calculated properties of the three flows agree with experimental results although the intermittency model gives inaccurate predictions of the intermittency profile for the axisymmetric jet, and the plane wake requires adjustment of one of the constants in order to simulate the intermittency adequately. A suggestion for removing these shortcomings is provided. Measurements of intermittency and conditioned streamwise velocities in jets and wakes are reviewed. The most reliable data for each flow situation are identified. Author (ESA)

N84-30256# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
PREDICTION OF THE TEMPERATURE CHARACTERISTICS IN INTERMITTENT, FREE TURBULENT SHEAR LAYERS
M. R. Malin Apr. 1984 56 p refs
(CFD/84/1) Avail: NTIS HC A04/MF A01

The velocity and temperature characteristics in intermittent, self-preserving free turbulent shear flows were calculated for the heated plane jet, the heated axisymmetric jet, and the far-field plane wake of a heated cylinder. An intermittency model of turbulence is developed to include the calculation of the conditioned temperature variables. Transport equations are presented for these variables and a model representing conduction heat-transfer at the turbulent/nonturbulent interface is suggested. Thermal measurements are reviewed for each flow situation and the most reliable data are identified. Conditional measurements are emphasized. Predictions agree with experimental data. Author (ESA)

N84-30257# University of Southern California, Los Angeles. Inst. for Marine and Coastal Studies.
WAVE UPLIFT PRESSURE ON HORIZONTAL PLATFORMS
K. Iradjpanah Mar. 1984 234 p refs Sponsored by National Oceanic and Atmospheric Administration
(PB84-190628; USCSC-TR-01-84) Avail: NTIS HC A11/MF A01 CSCL 13J

An analysis is presented to investigate aspects of wave hydrodynamic effects on a horizontal platform by numerical methods. A finite element procedure is developed to model the fluid region. The flow is assumed to be inviscid and irrotational. The two dimensional model treats the full non-linear free surface equations along with Laplace equation. In this model, the physical domain is subdivided into segments. The hydrodynamic equations of motion for each segment are independently mapped using isoparametric procedure, into an assemblage of mathematical planes of simple geometry. Finite element modelling is done in the sequence of mathematical planes. GRA

N84-29961# Naval Weapons Center, China Lake, Calif. Chemistry Div.
INTERFACIAL INTERACTION AND ADHESION IN COMPOSITE MATERIALS
R. Y. Yee and E. C. Martin *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 235-240 refs (For primary document see N84-29939 20-20)
(SR02403001)
Avail: NTIS HC A15/MF A01 CSCL 11/4

N84-30116# Nagoya Univ. (Japan). Dept. of Applied Physics.
NUMERICAL ANALYSIS OF THE BURST IN THE TURBULENT BOUNDARY LAYER, BASED ON THE THREE-DIMENSIONAL ORTEX MODEL
Sinzi Kuwabara *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 15-21 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30118# Institute of Space and Astronautical Science, Tokyo (Japan).
NUMERICAL SIMULATION OF AUTOROTATION
Naoki Izutsu and Yuko Oshima (Ochanomizu Univ.) *In its* Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 29-41 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30119# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
FREEJETS OF ROTATIONALLY RELAXING DIATOMIC GASES
Michio Nishida and Hideyuki Kobayashi *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 43-50 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30120# Kyoto Univ. (Japan). Dept. of Aeronautical Engineering.
VISUALIZATION FOR A FREE JET BY A LASER INDUCED FLUORESCENCE METHOD AND ITS STRUCTURE
Koji Teshima *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 51-60 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30121# Miyazaki Univ. (Japan). Dept. of Applied Physics.
REMARKS ON THERMAL ANALYSES OF THIN 4He FILMS IN SUPERFLUID HEAT PIPE
Kanji Etori *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 61-68 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30122# Osaka Univ. (Japan). Dept. of Aeronautical Engineering.
A BLOWUP PHENOMENON OF THE WORKING FLUID IN A TWO-PHASE CLOSED THERMOSYPHON
Kanji Negishi *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 69-74 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30123# Tokyo National Technical Coll. (Japan). Dept. of Mechanical Engineering.
AN EXPERIMENTAL STUDY OF HELICAL GUIDE-TYPE ROTA-

TING HEAT PIPE
Akihiro Shimizu and Shinichiro Yamazaki *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 75-82 (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30124# Suzuki Metal Industry Co. Ltd. (Japan).
THE HEAT PIPE EXCHANGER WITH CONTROLLABLE HEAT EXCHANGING AREA
Mitsuo Oshiro, Shigetoshi Takasu, Masao Kurihara, Kozo Taneda, Takashi Nakamoto, and Hitoshi Nakayama *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 83-92 (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30125# Suzuki Metal Industry Co. Ltd. (Japan).
EXPERIMENTAL STUDY OF THE NAPHTALINE HEAT PIPE
I. Honda, A. Suzuki, Y. Abe, and S. Sugihara *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 93-100 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30126# Fujikura Ltd., Sakura (Japan).
RESEARCH AND DEVELOPMENT OF LONG HEAT PIPES AND THEIR APPLICATIONS
M. Takaoka, T. Mohtai, M. Mochizuki, and K. Mashiko *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 101-106 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30127# Chuby Electric Power Co. (Japan).
STUDY OF LATENT HEAT STORAGE SYSTEM USED HEAT PIPES FOR COOLING OF UNDERGROUND CABLES
H. Takagi, T. Mohtai (Fujikura Ltd.), and K. Kojima (Fujikura Ltd.) *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 107-111 refs (For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01

N84-30874# Joint Publications Research Service, Arlington, Va.
INERTIAL AND SHEAR FLOW Abstract Only
V. V. Aleksandrov and Yu. D. Shmyglevskiy *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 11 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 2, Jan. 1984 p 280-283 Previously announced in IAA as A84-22790 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N84-30258# Honeywell Electro-Optics Center, Lexington, Mass.
HOLOGRAPHIC FLI FOR DETECTION OF DEFECTS Annual Report, 15 Jan. 1983 - 15 Jan. 1984
G. O. Reynolds, D. A. Servaes, J. B. VeVelis, D. Peirce, and R. Mayville Apr. 1984 81 p
(Contract F49620-82-C-0001)
(AD-A142733; Rept-8309-38; AFOSR-84-0539TR) Avail: NTIS HC A05/MF A01 CSCL 20/5

This interim report describes work performed during Phase 2 on Two-Step Holographic Fringe Linearization Interferometry. The FLI process consists of deflecting the object beam between holographic exposures to create linear fringes and spatial filtering of the image reconstructed from the hologram about the linear fringe carrier frequency. This filtering is meant to discriminate between subsurface defects and random fringe noise. During this phase a loading limitation for the FLI process (of one quarter wave/linear fringe period for out-of-plane deformations) was demonstrated. To circumvent this limitation, two modifications to the FLI process were investigated: Four-exposure FLI - a Moire technique; and Laser Pulse separation control with dynamic loading. With the former method linear fringes have been recovered from the random noise in simulated laboratory experiment. Experiments to demonstrate the fringe shifts at defect locations with differential loading are still in progress. Preliminary experiments performed on the NADC holographic system indicate that it should be adequate, albeit cumbersome, to demonstrate the Laser Pulse Control Method. The finite element analysis is predicting the experimental fringe patterns obtained with static loading; and the modeling effort for the dynamic loading experiments is discussed. Analysis for the moire resulting from the three exposure hologram is described. GRA

N84-30259# Stanford Univ., Calif.
A THEORY FOR CROSS-COUPLING IN ULTRASONIC TRANSDUCER ARRAYS
R. L. Baer and G. S. Kino Mar. 1984 14 p refs Submitted for publication
(Contract DE-AT03-81ER-10865)
(DE84-010327; DOE/ER-10865/T1) Avail: NTIS HC A02/MF A01

Ultrasonic transducer arrays suffer from the effects of acoustic cross coupling. The beam pattern and temporal response are degraded. The mechanism for acoustic cross coupling is due to surface wave propagation along the array. They may propagate in either the backing or load medium. The theory is based on an extension to periodic systems of the theory for excitation of a uniform semi infinite substrate by a single line source. It provides a quantitative model for cross coupling, as well as physical insight into its mechanism. DOE

N84-30260# Argonne National Lab., Ill.
ACTIVE ULTRASONIC CROSS-CORRELATION FLOWMETERS FOR MIXED-PHASE PIPE FLOWS
S. H. Sheen and A. C. Raptis 1984 15 p refs Presented at 30th Intern. Instrumentation Symp., Denver, 7 May 1984
(Contract W-31-109-eng-38)
(DE84-006449; CONF-840577-5) Avail: NTIS HC A02/MF A01

Two ultrasonic flowmeters which employ the active cross-correlation technique and use a simple clamp-on transducer arrangement are discussed. The flowmeter for solid/liquid flows was tested over a wide range of coal concentration in water and oil. The measured velocity based on the peak position of the cross-correlation function is consistently higher by about 15% than the average velocity measured by flow diversion. The origin of the difference results mainly from the flow velocity profiles and the transit-time probability distribution. The flowmeter that can measure particle velocity in a solid/gas flow requires acoustic decoupling arrangement between two sensing stations. The measured velocity is mainly associated with the particles near the wall. Performance of both flowmeters is presented. DOE

N84-30261# Department of Energy, Washington, D. C.
HELICAL SCREW VISCOMETER Patent Application
James H. Aubert, Richard N. Chapman, and Andrew M. Kraynik, inventors (to DOE) Filed 30 Jun. 1983 18 p
(Contract DE-AC04-76DP-00789)
(DE84-011111; US-Patent-Appl-SN-509758) Avail: NTIS HC A02/MF A01

A helical screw viscometer for the measurement of the viscosity of Newtonian and nonNewtonian fluids is comprised of an elongated cylindrical container closed by end caps defining a circular cylindrical cavity within the container, a cylindrical rotor member having a helical screw or ribbon flight carried by the other periphery thereof rotatably carried within the cavity. The fluid to be measured is confined in the cavity filling the space between the rotor and the container wall. The rotor member is supported by axle members journaled in the end caps, one axle extending through one end cap and connectable to a drive source. A pair of longitudinally spaced ports are provided through the wall of the container in communication with the cavity and a differential pressure meter is connected between the ports for measuring the pressure drop caused by the rotation of the helical screw rotor acting on the confined fluid for computing viscosity. DOE

N84-30262# Department of Energy, Washington, D. C.
VOID-PARTICULATE DIRECTOR Patent Application
Thomas N. Claytor and Henry B. Karplus, inventors (to DOE) Filed 26 Sep. 1983 14 p
(Contract W-31-109-eng-38)
(DE84-011300; US-Patent-Appl-SN-535979) Avail: NTIS HC A02/MF A01

Apparatus for detecting voids and particulates in a flowing stream of fluid contained in a pipe may comprise: a transducer for transmitting an ultrasonic signal into the stream, coupled to the pipe at a first location; a second transducer for detecting the through transmission of said signal, coupled to the pipe at a second location; a third transducer for detecting the back scattering of said signal, coupled to the pipe at a third location, said third location being upstream from said first location; and circuit means for normalizing the back scattered signal from said third transducer to the through transmitted signal from said second transducer. The normalized signal provides a measure of the voids and particulates flowing past said first location. DOE

N84-30263# Department of Energy, Washington, D. C.
IMPROVED GRAPHITE FURNACE ATOMIZER Patent Application
Darryl D. Siemer, inventor (to DOE) Filed 18 May 1983 23 p
(Contract DE-AC07-79ID-01675)
(DE84-011091; US-Patent-Appl-SN-495888) Avail: NTIS HC A02/MF A01

A graphite furnace atomizer for use in graphite furnace atomic absorption spectroscopy is described wherein the heating elements are affixed near the optical path and away from the point of sample deposition, so that when the sample is volatilized the spectroscopic temperature at the optical path is at least that of the volatilization temperature, whereby analyteconcomitant complex formation is advantageously reduced. The atomizer may be elongated along its axis to increase the distance between the optical path and the sample deposition point. Also, the atomizing may be elongated along the axis of the optical path, whereby its analytical sensitivity is greatly increased. DOE

N84-30264# Department of Energy, Washington, D. C.
ROTATIONAL VISCOMETER FOR HIGH-PRESSURE, HIGH-TEMPERATURE FLUIDS Patent Application
Kenneth R. Carr, inventor (to DOE) Filed 6 Jun. 1983 12 p
(Contract DE-AC05-84OR-21400)
(DE84-011094; US-Patent-Appl-SN-501313) Avail: NTIS HC A02/MF A01

The invention is a novel rotational viscometer which is well adapted for use with fluids at high temperatures and/or pressures. In one embodiment, the viscometer includes a substantially nonmagnetic tube having a closed and having an open end in communication with a fluid whose viscosity is to be determined. An annular drive magnet is mounted for rotation about the tube. The tube encompasses and supports a rotatable shaft assembly which carries a rotor, or bob, for insertion in the fluid. Affixed to the shaft are a second magnet which is magnetically coupled to the drive magnet and a third magnet. In a typical operation, the drive magnet is rotated to turn the shaft assembly while the shaft rotor is immersed in the fluid. The viscous drag. A first magnetic pickup generates a waveform whose phase is a function of the angular position of the drive magnet. A second magnetic pickup generates a waveform whose phase is a function of the angular position of the third magnet. Means are provided to generate an output indicative of the phase difference between the two waveforms. The viscometer is comparatively simple, inexpensive, rugged, and does not require shaft seals. DOE

N84-30265# Department of Energy, Washington, D. C.
IMPROVED GASEOUS LEAK DETECTOR Patent Application
Frank E. Juravic, Jr., inventor (to DOE) Filed 6 Oct. 1983 21 p
(Contract DE-AC02-76CH-03000)
(DE84-011295; US-Patent-Appl-SN-539369) Avail: NTIS HC A02/MF A01

In a short path length mass spectrometer type of helium leak detector wherein the helium trace gas is ionized, accelerated and deflected onto a particle counter, an arrangement is provided for converting the detector to neon leak detection. The magnetic field of the deflection system is lowered so as to bring the nonlinear fringe area of the magnetic field across the ion path, thereby increasing the amount of deflection of the heavier neon ions. DOE

N84-30266# Department of Energy, Washington, D. C.
HIGH RESOLUTION, HIGH RATE X-RAY SPECTROMETER Patent Application
Frederick S. Goulding and Donald A. Landis, inventors (to DOE) Filed 14 Jul. 1983 22 p
(Contract DE-AC03-76SF-00098)
(DE84-011116; US-Patent-Appl-SN-513557) Avail: NTIS HC A02/MF A01

A pulse processing system for use with detected signals of a wide dynamic range which is capable of very high counting rates, with high throughput, with excellent energy resolution and a high signal to noise ratio is provided. A pulse processing system wherein the fast channel resolving time is quite short and substantially independent of the energy of the detected signals is described. A pulse processing system having a pile-up rejector circuit which will allow the maximum number of noninterfering pulses to be passed to the output is also provided. New methods for generating substantially symmetrically triangular pulses for use in both the main and fast channels of a pulse processing system are suggested. DOE

N84-30267# Department of Energy, Washington, D. C.
VAPOR SPILL PIPE MONITOR Patent Application
Gregory M. Bianchini and Thomas G. McRae, inventors (to DOE) Filed 23 Jun. 1983 12 p
(Contract W-7405-eng-48)
(DE84-011103; US-Patent-Appl-SN-507188) Avail: NTIS HC A02/MF A01

The invention is a method and apparatus for continually monitoring the composition of liquefied natural gas flowing from a spill pipe during a spill test by continually removing a sample of the LNG by means of a probe, gasifying the LNG in the probe, and sending the vaporized LNG to a remote IR gas detector for analysis. The probe comprises three spaced concentric tubes surrounded by a water jacket which communicates with a flow channel defined between the inner and middle, and middle and outer tubes. The inner tube is connected to a pump for providing suction, and the probe is positioned in the LNG flow below the spill pipe with the tip oriented partly downward so that LNG is continuously drawn into the inner tube through a small orifice. The probe is made of a high thermal conductivity metal. Hot water is flowed through the water jacket and through the flow channel between the three tubes to provide the necessary heat transfer to flash vaporize the LNG passing through the inner channel of the probe. The gasified LNG is transported through a connected hose or tubing extending from the probe to a remote IR sensor which measures the gas composition. DOE

N84-30268# Los Alamos Scientific Lab., N. Mex. Materials Science and Technology Div.
NEW EXPERIMENTAL TECHNIQUES WITH THE SPLIT HOPKINSON PRESSURE BAR
C. E. Frantz, P. S. Follansbee, and W. J. Wright 1984 28 p

refs Presented at the 8th Intern. Conf. on High Energy Rate Fabrication, San Antonio, 17-21 Jun. 1984
(Contract W-7405-eng-36)
(DE84-003818; LA-UR-83-3422; CONF-840653-1) Avail: NTIS HC A03/MF A01

The split Hopkinson pressure bar or Kolsky which provides a technique for performing compression tests at strain rates approaching 10(4) is discussed. At these strain rates, the small dimensions possible in a compression test specimen give an advantage over a dynamic tensile test by allowing the stress within the specimen to equilibrate within the shortest possible time. The maximum strain rates possible with this technique are limited by stress wave propagation in the elastic pressure bars and in the deforming specimen. It is emphasized that a slowly rising excitation is preferred to one that rises steeply. Experimental techniques for pulse shaping and a numerical procedure for correcting the raw data for wave dispersion in the pressure bars are presented. A bar mover apparatus was developed for tests at elevated temperature which effectively brings the cold pressure bars into contact with the specimen, which is heated with a specially designed furnace, shortly before the pressure wave arrives. DOE

N84-30269# KMS Fusion, Inc., Ann Arbor, Mich.
HOLOGRAPHIC INTERFEROMETRY USING 20-PICOSECOND UV PULSES TO OBTAIN TIME RESOLVED HYDRO MEASUREMENTS OF SELENIUM AND GOLD PLASMAS
Garland E. Busch, R. R. Johnson, and C. L. Shepard 1984 5 p refs Presented at the Topical Meeting on Ultrafast Phenomena, Monterey, Calif., 12 Jun. 1984
(Contract DE-AC08-82DP-40152)
(DE84-009485; KMSF-U-1445; CONF-406104-2) Avail: NTIS HC A02/MF A01

A plasma probing (263 nm) pulse, from a temporally compressed YLF oscillator, delineates electron densities of very early (10 to 150 psec) selenium and gold plasmas using holographic interferometry. DOE

N84-30270# Messerschmitt-Boelkow-Blohm G.m.b.H., Bremen (West Germany).
DEVELOPMENT OF A 6-COMPONENT BALANCE FOR THE CRYOGENIC RANGE Final Report, April 1983
Eberhard Graewe Bonn Bundesministerium fuer Forschung und Technologie Jun. 1984 51 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-84-022; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11

Criteria for wind tunnel strain gage component balances applicable in the temperature range 100 to 300 K were derived. An unheated six-component balance was constructed and examined. With the corresponding software this balance is practibable on quasi stationary temperatures in the range 100 to 300 K. Author (ESA)

N84-30271# National Center for Devices and Radiological Health, Rockville, Md.
INSTRUMENTATION FOR NONIONIZING RADIATION MEASUREMENT Final Report
Jan. 1984 39 p refs Prepared in cooperation with Conference of Radiation Control Program Directors, Inc., Rockville, Md. Sponsored in part by NBS
(PB84-180603; HHS/PUB-FDA-84-8222; FDA/NCDRH-84-24) Avail: NTIS HC A03/MF A01 CSCL 06R

The successful evaluation of a given exposure to non-ionizing radiation requires several steps. The source must be identified and characterized so that the most appropriate measurement technique and instrument may be selected. The use of any instrument requires an understanding of the nature of the quantity to be measured, and of the limitations of the instrument to be used. Finally, a knowledge of the pertinent safety standards or guidelines to determine the significance of the measured values must be had. This evaluation process for optical, radiofrequency/microwave, ELF (powerline frequency), and acoustic radiation is described. Many practical measurement considerations and a comprehensive listing of the specifications and applications of commercially available instruments are included. GRA

N84-30272# Bureau of Mines, Amarillo, Tex. Helium Field Operations.
ANALYZER FOR DETERMINING HELIUM-4 IN THE PART-PER-BILLION RANGE
P. W. Holland 1984 16 p refs
(PB84-189554; BM-RI-8853; LC-83-600353) Avail: NTIS HC A02/MF A01 CSCL 14B

A trace helium analyzer for determining helium-4 in the parts-per-billion range has been developed. The instrument is used for anayzing pure gases, laboratory-prepared standards, and atmospheric samples. The analyzer consists of a modified helium leak detector mass spectrometer, a laboratory-built sample inlet system, and a liquid nitrogen cooled charcoal trap. A programmable integrator and event control module make automatic operation possible. The portability of the analyzer allows it to be used in the field. GRA

N84-29957# United Technologies Corp., San Jose, Calif. Chemical Systems Div.
STRESS TRANSDUCER INTERPRETATION ANALYSIS AND STABILITY DATA
E. C. Francis and R. E. Thompson *In* APL The 1984 JANNAF Propulsion Meeting, Vol. 2 Feb. 1984 p 199-210 refs (For primary document see N84-29939 20-20)
(Contracts F04611-75-C-0042; F04611-79-C-0019)
Avail: NTIS HC A15/MF A01 CSCL 14/2

N84-30373*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRE-LAUNCH ABSOLUTE RADIOMETRIC CALIBRATION OF LANDSAT-4 PROTOFLIGHT THEMATIC MAPPER
John L. Barker, D. L. Ball (Computer Sciences Corp., Silver Spring, Md.), K. C. Leung (Computer Sciences Corp., Silver Spring, Md.), and J. A. Walker (Santa Barbara Research Center, Goleta, Calif.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 130-139 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

N84-30374*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RELATIVE RADIOMETRIC CALIBRATION OF LANDSAT TM REFLECTIVE BANDS
John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 140-180 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

N84-30375*# Rochester Inst. of Tech., N. Y.
EVALUATION OF THE RADIOMETRIC INTEGRITY OF LANDSAT-4 THEMATIC MAPPER BAND 6 DATA
John R. Schott *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 181-185 refs ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

N84-30379*# European Space Agency, Frascati (Italy).
A PRELIMINARY ANALYSIS OF LANDSAT-4 THEMATIC MAPPER RADIOMETRIC PERFORMANCE
C. Justice, L. Fusco, and W. Mehl (Joint Research Centre of the European Communities) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 199 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

N84-30382*# European Space Agency, Frascati (Italy). Earthnet Programme Office.
TM FAILED DETECTORS DATA REPLACEMENT

L. Fusco and D. Trevese *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 7-14 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30383*# Arizona Univ., Tucson. Remote Sensing Center.
IN-FLIGHT ABSOLUTE RADIOMETRIC CALIBRATION OF THE THEMATIC MAPPER
K. R. Castle, R. G. Holm, C. J. Kastner, J. M. Palmer, P. N. Slater, M. Dinguirard (Centre d'Etudes et de Recherche de Toulouse, France), C. E. Ezra (Dept. of Agriculture, Beltsville, Md.), D. Jackson (Dept. of Agriculture, Beltsville, Md.), and R. K. Savage (Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 15-19 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30384*# National Oceanic and Atmospheric Administration, Washington, D. C. National Environmental Satellite, Data, and Information Service.
LANDSAT-4 THEMATIC MAPPER CALIBRATION AND ATMOSPHERIC CORRECTION Abstract Only
Warren A. Hovis *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 20 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30402*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPECTRAL CHARACTERIZATION OF THE LANDSAT-4 MSS SENSORS
Brian L. Markham and John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 73-75 Previously announced as N84-15634 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30403*# Environmental Research Inst. of Michigan, Ann Arbor.
INVESTIGATION OF RADIOMETRIC PROPERTIES OF LANDSAT-4 MSS
Daniel R. Rice and William A. Malila *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 76-80 ref ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30410*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IMPACT OF THEMATIC MAPPER SENSOR CHARACTERISTICS ON CLASSIFICATION ACCURACY
Darrel L. Williams, James R. Irons, Brian L. Markham, Ross F. Nelson, David L. Toll, Richard S. Latty (Maryland Univ., College Park), and Mark L. Stauffer (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 93-97 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30421*# Technicolor Graphic Services, Inc., Sioux Falls, S. Dak.
STUDY OF THEMATIC MAPPER AND MULTISPECTRAL SCANNER DATA APPLICATIONS
F. G. Sadowski, R. H. Haas, J. A. Sturdevant, W. H. Anderson, P. M. Seevers, J. W. Feuquay, L. K. Balick, F. A. Waltz, and D. T. Lauer (EROS Data Center, Sioux Falls, S. Dak.) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 129-132 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30864# Joint Publications Research Service, Arlington, Va.
USE OF PELTIER EFFECT FOR SMALL SIGNAL AMPLIFICATION AND CONVERSION Abstract Only
Yu. I. Ageyev, M. M. Akperov, K. Z. Kobakhidze, and M. V. Nebuchinov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 2 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1396-1400 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30865# Joint Publications Research Service, Arlington, Va.
DETECTING OPTICAL POLARIZATION OF NUCLEI IN SEMICONDUCTORS WITH SUPER-CONDUCTING QUANTUM INTERFEROMETER Abstract Only
L. S. Vlasenko, N. V. Zavaritskiy, and V. G. Fleysher *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 3 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1377-1381 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30882# Joint Publications Research Service, Arlington, Va.
HOLOGRAPHIC IMAGE SUBTRACTION BY RECORDING IN FOURIER PLANE AND SPACE FILTRATION WITH THIN LIGHT BEAM Abstract Only
I. S. Klimenko, S. N. Malov, and V. P. Ryabukho *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 1 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, Sep. 1983 p 365-369 Original language document previously announced in IAA as A84-11363 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30883# Joint Publications Research Service, Arlington, Va.
MICROSPECTROPHOTOMETER FOR CRYSTAL ANALYSIS BY ABSORPTION REFLECTOMETRY Abstract Only
G. V. Papayan and L. S. Agroskin *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 19-20 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, no. 1, Sep. 1983 p 97-100 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

36 LASERS AND MASERS

Includes parametric amplifiers.

N84-30273*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ORBITAL STABILITY IN COMBINED UNIFORM AXIAL AND THREE-DIMENSIONAL WIGGLER MAGNETIC FIELDS FOR FREE-ELECTRON LASERS
Shayne Johnston Aug. 1984 29 p refs
(NASA-TM-83753; E-2241; NAS 1.15:83753) Avail: NTIS HC A03/MF A01 CSCL 20E

Zachary [Phys. Rev. A 29 (6), 3224 (1984)] recently analyzed the instability of relativistic-electron helical trajectories in combined uniform axial and helical wiggler magnetic fields when the radial variation of the wiggler field is taken into account. It is shown here that the type 2 instability comprised of secular terms growing linearly in time, identified by Zachary and earlier by Diament [Phys. Rev. A 23 (5), 2537 (1981)], is an artifact of simple perturbation theory. A multiple-time-scale perturbation analysis reveals a nonsecular evolution on a slower time scale which accommodates an arbitrary initial perturbation. It is shown that, in the absence of exponential instability, the electron seeks a modified helical orbit more appropriate to its perturbed state and oscillates stably about it. Thus, the perturbed motion is oscillatory but nonsecular, and hence the helical orbits are stable. Author

N84-30274*# Old Dominion Univ., Norfolk, Va. Dept. of Physics.

THEORETCIAL STUDIES OF SOLAR-PUMPED LASERS Progress Report, 15 Jan. - 15 Jul. 1984

Wynford L. Harries and Zeng-Shevan Fong Jul. 1984 28 p refs
(Grant NsG-1568)
(NASA-CR-173833; NAS 1.26:173833; PTR-84-4) Avail: NTIS HC A03/MF A01 CSCL 20E

A method of pumping a COhZ laser by a hot cavity was demonstrated. The cavity, heated by solar radiation, should increase the efficiency of solar pumped lasers used for energy conversion. Kinetic modeling is used to examine the behavior of such a COhZ laser. The kinetic equations are solved numerically vs. time and, in addition, steady state solutions are obtained analytically. The effect of gas heating filling the lower laser level is included. The output power and laser efficiency are obtained as functions of black body temperature and gas ratios (COhZ-He-Ar) and pressures. The values are compared with experimental results. Author

N84-30275# Defense Intelligence Agency, Washington, D.C. Directorate for Scientific and Technical Intelligence.

BIBLIOGRAPHY OF SOVIET LASER DEVELOPMENTS, NUMBER 64, MARCH -APRIL 1983

6 Mar. 1984 171 p
(AD-A141906; DIA-DST-2700Z-002-84) Avail: NTIS HC A08/MF A01 CSCL 20/5

This is the Soviet Laser Bibliography for March-April 1983, and is No. 64 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; crystal growing; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; adaptive optics; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. Author (GRA)

N84-30276# KMS Fusion, Inc., Ann Arbor, Mich.

EXPERIMENTS AND THEORY ON HALF-HARMONIC LIGHT AND 2-PLASMON DECAY

R. L. Berger, G. Busch, R. R. Johnson, L. V. Powers, R. J. Schroeder, C. L. Shepard, and J. A. Tarvin 1984 5 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. 1984
(Contract DE-AC08-82DP-40152)
(DE84-008945; CONF-840616-11) Avail: NTIS HC A02/MF A01

Experimental data and theoretical calculations of half integer harmonic light emission from laser heated plasmas are presented. The data are quantitatively interpreted by theoretical models. DOE

N84-30277# Los Alamos Scientific Lab., N. Mex.

FREE ELECTRON LASERS AND RELATED TOPICS

Jerry M. Watson 1984 5 p refs Presented at Linear Accelerator Conf. LINAC 84, Darmstadt, West Germany, 7 May 1984
(Contract W-7405-eng-36)
(DE84-011332; LA-UR-84-1217; CONF-840529-9) Avail: NTIS HC A02/MF A01

Oscillator experiments are performed with wavelengths from the visible to far infrared. The output powers are steadily advancing. The status of these programs are discussed. As shorter wavelengths and higher powers are pursued, higher currents with improved beam quality are required. Advanced electron linacs are necessary to meet these demands. DOE

N84-30278# Los Alamos Scientific Lab., N. Mex.

ELECTRON BEAM DIAGNOSTIC FOR THE LOS ALAMOS FREE ELECTRON LASER OSCILLATOR EXPERIMENT

Richard L. Sheffield 1984 4 p refs Presented at the Linear Accelerator Conf. LINAC 84, Darmstadt, West Germany, 7-11 May 1984
(Contract W-7405-eng-36)
(DE84-011348; LA-UR-84-1191; CONF-840529-7) Avail: NTIS HC A02/MF A01

An electron beam diagnostic for a free electron laser (FEL) oscillator experiment is used to measure the time dependence of the electron energy distribution in a 100-(MU)s time interval. The electron beam consists of macropulses that have a duration of 100 (MU)s and a repetition rate of 1 Hz. Each macropulse consists of a series of micropulses that have approx. 30 ps duration, approx. 50 A peak current, and approx. 50 ns separation. The primary purpose of the electron beam diagnostic is measurement of the time dependence of the electron energy distribution during the build up of the photon field in the oscillator. Since the exact time of build up depends on various RF and cavity considerations, provisions are made to allow the observation window to be varied from 10 to 100 (MU)s and to be delayed by times up to 100 (MU)s. DOE

N84-30279# Los Alamos Scientific Lab., N. Mex.

THE XUV/VUV FREE-ELECTRON LASER OSCILLATOR

J. C. Goldstein, B. E. Newnam, R. K. Cooper, and J. C. Comly, Jr. Apr. 1984 12 p refs Presented at the 2nd Top. Meeting on Laser Tech. in the Extreme Ultraviolet, Bolder, Colo., 5 Mar. 1984
(Contract W-7405-eng-36)
(DE84-011347; LA-UR-84-1384; CONF-840387-7) Avail: NTIS HC A02/MF A01

Computations based on a detailed theoretical model showed that modest improvements in electron beam and optical mirror technologies will enable a free electron laser, driven by an RF linear accelerator, to operate in the 50 to 200 nm range of optical wavelengths. DOE

N84-30280# Los Alamos Scientific Lab., N. Mex.

EXPLORATION OF PHASE STABILITY IN THE SURFATRON ACCELERATOR

D. V. Neuffer 7 May 1984 4 p refs Presented at Linear Accelerator Conf., Darmstadt-Seeheim, West Germany, 7 May 1984
(Contract W-7405-eng-36)
(DE84-011416; LA-UR-84-1349; CONF-840529-8) Avail: NTIS HC A02/MF A01

Proton and electron motion in a laser beat-wave accelerator with a transverse magnetic field is explored. Parameters of stable acceleration are determined analytically and by simulation. The effects of synchrotron radiation on electron acceleration are also explored. DOE

N84-30281# Department of Energy, Washington, D. C.

INDUCTIVELY STABILIZED, LONG PULSE DURATION TRANSVERSE DISCHARGE APPARATUS Patent Application

R. C. Sze, inventor (to DOE) Filed 1 Sep. 1983 21 p
(Contract W-7405-eng-36)
(DE84-011301; US-Patent-Appl-SN-528509) Avail: NTIS HC A02/MF A01

An inductively stabilized, long pulse duration transverse discharge apparatus is presented. The use of a segmented electrode where each segment is attached to an inductive element permits high-energy, high-efficiency, long pulsed laser outputs to be obtained. The apparatus was demonstrated with rare gas halide lasing media. Orders of magnitude increase in pulse repetition frequency are obtained in lasing devices that do not utilize gas flow. DOE

N84-30282# Department of Energy, Washington, D. C.

REFLEX RING LASER AMPLIFIER SYSTEM Patent Application

Mark A. Summers, inventor (to DOE) Filed 31 Aug. 1983 16 p
(Contract W-7405-eng-48)
(DE84-010874; US-Patent-Appl-SN-528285) Avail: NTIS HC A02/MF A01

The invention is a method and apparatus for providing a reflex ring laser system for amplifying an input laser pulse. The invention is particularly useful in laser fusion experiments where efficient production of high-energy and high power laser pulses is required. The invention comprises a large aperture laser amplifier in an unstable ring resonator which includes a combination spatial filter and beam expander having a magnification greater than unity. An input pulse is injected into the resonator, e.g., through an aperture in an input mirror. The injected pulse passes through the amplifier and spatial filter/expander components on each pass around the ring. The unstable resonator is designed to permit only a predetermined number of passes before the amplified pulse exits the resonator. On the first pass through the amplifier, the beam fills only a small central region of the gain medium. On each successive pass, the beam was expanded to fill the next concentric non-overlapping region of the gain medium. DOE

N84-30283# California Univ., Livermore. Lawrence Livermore Lab.
PHOTOEMISSIVE MATERIALS FOR 0.35 MICRON LASER FIDUCIALS IN X-RAY STREAK CAMERAS
Charley P. Hale, Hector Medecki, and Peter H. Y. Lee 1984 18 p refs Presented at the 2nd Topical Meeting on Laser Tech. in the Extreme Ultraviolet, Boulder, Colo., 5 Mar. 1984
(Contract W-7405-eng-48)
(DE84-008348; UCRL-90089; CONF-840387-2) Avail: NTIS HC A02/MF A01

Using a soft X-ray streak camera, materials are tested for suitability as transmission photocathodes when irradiated by 0.35 micron laser pulses. Preliminary measurements of sensitivity, dynamic range and temporal resolution are reported. A practical fiber optic fiducial under development for laser fusion X-ray diagnostics on the LLNL Nova laser system is described. DOE

N84-30284# Los Alamos Scientific Lab., N. Mex.
INDUCTIVELY STABILIZED EXCIMER LASERS
Robert C. Sze Dec. 1983 7 p refs Presented at the Intern. Conf. on Lasers and Appl., San Francisco, 12 Dec. 1983
(Contract W-7405-eng-36)
(DE84-011371; LA-UR-84-1190; CONF-831265-4) Avail: NTIS HC A02/MF A01

The technique of inductive stabilization of rare-gas halide discharges were shown to yield long pulse laser outputs. The 1% efficiency obtained for the miniature short pulsed devices are believed to be very good. Length scaling to improve the gain per round trip of the laser cavity should improve the peak power in the cavity and greatly improve the extraction efficiency. The measurement of a saturation energy for electrical energy deposition gives an important design criteria for high efficiency lasers. This number is believed to be valid regardless of the time scale of the energy deposition. DOE

N84-30285# Los Alamos Scientific Lab., N. Mex.
EFFICIENT FORWARD CONVERSION IN A RAMAN GENERATOR
J. L. Carlsten, J. M. Telle, and R. G. Wenzel 1984 14 p refs Presented at the 13th Intern. Quantum Electron. Conf., Anaheim, Calif., 18 Jun. 1984 Submitted for publication
(Contract W-7405-eng-36)
(DE84-007466; LA-UR-84-635; CONF-840629-2) Avail: NTIS HC A02/MF A01

Stimulated Raman scattering of an XeCl laser at 308 nm in a high pressure H2 cell shows anomalously high conversion into first Stokes (S1) when a pumping geometry with a Fresnel number near unity is used. Specifically a quantum efficiency of 88% is obtained into S1. Comparison with a plane wave model indicates that a theory including diffraction and 4 wave mixing may be necessary to understand the anomalous holdoff of the second Stokes component. DOE

N84-30286# Washington Univ., Seattle. Dept. of Nuclear Engineering.
STUDY OF STIMULATED BRILLOUIN AND RAMAN SCATTERING Final Report, 1982 1983
Z. Adam Pietrzyk, Robert D. Brooks, and Russell Berger 1983 21 p refs
(DE84-011260; DOE/DP-40137/2) Avail: NTIS HC A02/MF A01

Stimulated Brillouin and Raman scattering (SRS) and hot electron production and computer modeling of these processes are discussed. The plasma was preformed with n everywhere less than 1/4 n/sub c/, and hot electrons generated exclusively by the SRS process was observed, a situation rare among STS experiments. Using 10.6 (MU)m radiation from a pulsed CO2 laser, suprathermal electron distributions were directly detected which have Maxwellian shapes and corresponding temperatures from 29 to 105 keV. A temporal correlation between the fast electron pulses and the back scattered SRS radiation is also observed. DOE

N84-30287# Stanford Linear Accelerator Center, Calif.
COMPUTER SIMULATION OF THE LASERTRON
W. B. Herrmannsfeldt Apr. 1984 14 p refs
(Contract DE-AC03-76SF-00515)
(DE84-012242; SLAC/AP-21) Avail: NTIS HC A02/MF A01

The concept of the Lasertron is described. A short bunch of electrons (short in time compared to the period of an RF cycle), is emitted from the cathode and accelerated by a dc potential toward the anode. An RF cavity, located just past the anode aperture, is the output cavity. The RF frequency is determined by the pulse rate of the electron bunches. Although other types of solid-state cathodes are possible, if a photo-cathode is used, then the light source will likely be a fast pulsing, hence the name Lasertron. The device cannot be properly called a Laser klystron since the name implies the waves of RF current by which a dc beam is bunched. In the Lasertron, the electrons are emitted bunched and it is only necessary to accelerate them before space charge forces cause too much debunching. DOE

N84-30288# California Univ., Livermore. Lawrence Livermore Lab.
NOVA LASER ALIGNMENT CONTROL SYSTEM
Paul J. VanArsdall, Frederick W. Holloway, David L. McGuigan, and Randy T. Shelton 29 Mar. 1984 29 p refs Presented at the SPIE Tech. Symp., Arlington, Va., 29 Apr. - 4 May 1984
(Contract W-7405-eng-48)
(DE84-010992; UCRL-90033; CONF-8404124-4) Avail: NTIS HC A03/MF A01

Alignment of the Nova laser which requires control of hundreds of optical components in the 10 beam paths is discussed. The control system is designed to provide both centralized and local manual operator controls which are integrated with automatic closed loop alignment. Menudriven operator consoles which use high resolution color graphics displays overlaid with transport touch panels allow laser pesonnel to interact efficiently with the computer system. Automatic alignment is accomplished by the use of image analysis techniques to determine beam references points from video images acquired along the laser chain. The goal of the design is to contribute to rapid experimental turnaround and consistent alignment results. The computer based control structure and the software methods developed for aligning this large laser system are described. DOE

N84-30289# Los Alamos Scientific Lab., N. Mex.
A CONVECTIVE MECHANISM FOR INHIBITION OF HEAT CONDUCTION IN LASER PRODUCED PLASMAS
P. H. Y. Lee, O. Willi, and R. J. Trainor 27 Jun. 1984 7 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract W-7405-eng-36)
(DE84-011336; LA-UR-84-1154; CONF-840616-15) Avail: NTIS HC A02/MF A01

In laser-produced plasmas, the laser energy is absorbed only below and up to the critical density. For laser fusion applications, this energy must be transported beyond the corona via electron thermal conduction towards colder, higher density regions of the target to heat up material and cause ablation, which in turn generates an inward pressure to compress the fusion fuel. If the heat conduction is inhibited, the consequences are a weaker ablation and therefore a weaker implosion. For many years now, the inhibition of heat conduction, i.e., the reduction of heat conduction relative to classical conduction, in laser-produced plasmas at relevant irradiances was apparent from the large body of experimental evidence. Many mechanisms, such as dc magnetic fields, ion acoustic turbulence, and Weibel instabilities, were proposed to be the cause of inhibition of heat conduction. Even improved calculations of the classical heat flux were carried out to solve this problem. Nevertheless, no single one of the above mentioned mechanisms explains the large inhibition observed in the experiments. DOE

N84-30290# Naval Research Lab., Washington, D. C. Center for Space Research.
MEASUREMENTS OF HIGH RESOLUTION SPECTRA ON THE OMEGA LASER AT ROCHESTER UNIVERSITY
U. Feldman 1984 5 p
(Contract DE-AI08-79DP-40092)
(DE84-012419; DOE/DP-40092/3) Avail: NTIS HC A02/MF A01

A very high resolution grazing incidence spectrograph and vacuum chamber were attached to the Omega laser facility. The 3 m (88(0)) grazing incidence grating spectrograph can be used with either of two Bausch and Lomb gold replica gratings. One of the gratings has 1200 lines mm(-1) blazed at 2(0) 35', and although its wavelength coverage extends to 385 A, the spectrograph is most efficient between 8 A and 130 A. The spectral resolution near 100 A obtained with this configuration is better than 0.03 A. The second grating has 600 lines mm(-1) blazed at 6(0) 2'. DOE

N84-30291# Tennessee Univ., Knoxville. Dept. of Chemistry.
CAPILLARY SEPARATIONS WITH CALORIMETRIC ABSORBANCE DETECTION Technical Progress Report, 1 Sep. 1983 - 31 Aug. 1984
M. J. Sepaniak 1984 13 p refs
(Contract DE-AS05-83ER-13127)
(DE84-012466; DOE/ER-13127/03) Avail: NTIS HC A02/MF A01

Preliminary single beam thermal lens experiments were performed by using an argon ion laser. The feasibility of performing thermal lens detection in very small flow cells was tested. Different procedures for treating the inside surfaces of glass and quartz capillary columns to provide reasonable capacity and high efficiency in open tabular liquid chromatography separations was investigated. Using the request excimer pumped dye laser, different optical arrangements for performing pulsed double beam thermal lens detection in small flow cells are evaluated. DOE

N84-30458*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RESULTS OF LASER RANGING COLLOCATIONS DURING 1983
Ronald Kolenkiewicz *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 20E

N84-30459*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A COMPARISON BETWEEN LAGEOS LASER RANGING AND VLBI DETERMINED BASELINES
Ronald Kolenkiewicz and James W. Ryan *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 20E

N84-30493# Joint Publications Research Service, Arlington, Va.
RESONANCE ABSORPTION OF NARROW-BAND LASER RADIATION BY ATMOSPHERIC GASES Abstract only
A. A. Mitsel, Yu. N. Ponomarev, and K. M. Firsov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 72 refs
Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 327-329 Document also announced as A84-30422 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30875# Joint Publications Research Service, Arlington, Va.
NEW LASING FERROELECTRIC MATERIAL Pb5Ge3O11-Nd-3(+) Abstract Only
A. A. Kaminskiy, G. D. Kursten, and D. Schultze *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 12
Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 270, no. 6, Jun. 1983 p 1373-1376 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30879# Joint Publications Research Service, Arlington, Va.
HEATING AND IMPLOSION OF SPHERICAL TARGETS IRRADIATED BY LASER Abstract Only
B. L. Vasin, A. A. Yerokhin, N. N. Zorev, A. A. Kologrivov, A. S. Rupasov, G. V. Sklizkov, and A. S. Shikanov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 16 refs
Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzimodeystviye Lazernogo Izlucheniya s Termoyadernymi Mishenyami (Moscow), v. 133, 1983 p 51-145 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N84-30292 National Physical Lab., Teddington (England). Div. of Materials Applications.
EYEBOLTS FOR LIFT SUSPENSION
T. Gorley 1984 26 p refs
(Contract HSE-1533)
(NPL-DMA(A)70; ISSN-0143-7313) Copyright. Avail: Issuing Activity

The British Standard (BS) 529 Part 2 "Steel Eyebolts without Collars for Lift Suspension" is discussed. Data for the revised standard BS 5655 eyebolt shape; material; rope diameters; working load limit; proof force; minimum breaking force of eyebolt; screw threads; internal dimensions of the eye; nominal length and screwed length of the shank; diameter of the material in the eye; and length of thread engagement and strength of nuts are given. Author (ESA)

N84-30293*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRANSMISSION EFFICIENCY MEASUREMENTS AND CORRELATIONS WITH PHYSICAL CHARACTERISTICS OF THE LUBRICANT
John J. Coy, Andrew M. Mitchell, and Bernard J. Hamrock 1984 20 p refs Proposed for presentation at the 64th Symp. of the Propulsion and Energetics Panel on Gears and Transmission Systems for Helicopters and Turboprops, Lisbon, 8-12 Oct. 1984; sponsored by AGARD Prepared in cooperation with Army Research and Technology Labs.
(NASA-TM-83740; E-2167; NAS 1.15:83740; USAAVSCOM-TR-84-C-11) Avail: NTIS HC A02/MF A01 CSCL 11H

Data from helicopter transmission efficiency tests were compared to physical properties of the eleven lubricants used in those tests. The tests were conducted with the OH-58 helicopter main rotor transmission. Efficiencies ranged from 98.3 to 98.8 percent. The data was examined for correlation of physical properties with efficiency. There was a reasonable correlation of efficiency with absolute viscosity if the viscosity was first corrected for temperature and pressure in the lubricated contact. Between lubricants, efficiency did not correlate well with viscosity at atmospheric pressure. Between lubricants, efficiency did not correlate well with calculated lubricant film forming capacity. Bench type sliding friction and wear measurements could not be correlated to transmission efficiency and component wear. Author

N84-30294*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SUMMARY OF DRIVE-TRAIN COMPONENT TECHNOLOGY IN

HELICOPTERS
Gilbert J. Weden and John J. Coy 1984 24 p refs Proposed for presentation at the NATO-AGARD PEP 64th Symp. on Gears and Power Transmissions for Helicopters and Turboprops, Lisbon, 8-12 Oct. 1984 Prepared in cooperation with Army Research and Technology Labs.
(DA Proj. 1L1-61101-AH-45)
(NASA-TM-83726; E-1296; NAS 1.15:83726;
USAAVSCOM-TR-84-C-10) Avail: NTIS HC A02/MF A01 CSCL 13I

A review of current helicopters was conducted to determine the technology in the drive-train systems. The design features are highlighted including reliability characteristics in transmission systems for the OH-58, UH-1, CH-47, and UH-60 helicopters. In addition, trade-offs involving cost, reliability and life are discussed. Author

N84-30295# Department of Energy, Washington, D. C.
CERAMIC-GLASS-METAL SEAL BY MICROWAVE HEATING Patent Application
Thomas T. Meek and Rodger D. Blake, inventors (to DOE) Filed 4 Oct. 1983 10 p
(Contract W-7405-eng-36)
(DE84-011283; US-Patent-Appl-SN-538889) Avail: NTIS HC A02/MF A01

A method for producing a ceramic-glass-metal seal by microwaving, mixes a slurry of glass sealing material and coupling agent and applies the same to ceramic and metal workpieces. The slurry and workpieces are then insulated and microwaved at a power, time and frequency sufficient to cause a liquid-phase reaction in the slurry. The reaction of the glass sealing material forms a chemically different seal than that which would be formed by conventional heating because it is formed by diffusion rather than by wetting of the reactants. DOE

N84-30296*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DUAL ARM MASTER CONTROLLER CONCEPT: CONSOLIDATED FUEL REPROCESSING PROGRAM
D. P. Kuban (ORNL, Tenn.) and G. S. Perkins Apr. 1984 16 p refs Presented at the Topical Meeting on Robotics and Remote Handling in Hostile Environments, Gatlinburg, Tenn., 23 Apr. 1984 Sponsored by NASA
(Contracts DE-AC05-84OR-21400; W-7405-eng-26)
(NASA-CR-173843; NAS 1.26:173843; DE84-011633;
CONF-840413-11) Avail: NTIS HC A02/MF A01 CSCL 13I

The Advanced Servomanipulator (ASM) slave was designed with an anthropomorphic stance, gear/torque tube power drives, and modular construction. These features result in increased inertia, friction, and backlash relative to tape driven manipulators. The human factors design and performance tradeoffs associated with corresponding master controller best suited for the ASM were studied. The results of the studies and the conceptual design of the dual arm master controller are presented. DOE

N84-30297# Ecole Polytechnique Federale de Lausanne (Switzerland). Lab. de Thermique Appliquee.
TWO-DIMENSIONAL AND QUASI THREE-DIMENSIONAL EXPERIMENTAL STANDARD CONFIGURATIONS FOR AEROELASTIC INVESTIGATIONS IN TURBOMACHINE-CASCADES
T. Fransson and P. Suter 30 Sep. 1983 199 p
(Grants AF-AFOSR-0251-81; AF-AFOSR-0063-83)
(AD-A141904; EPFL/LTA-TM-83-2) Avail: NTIS HC A09/MF A01 CSCL 20/4

The aeroelastician needs reliable, efficient methods for the calculation of unsteady blade forces in turbomachines. The validity of such theoretical or empirical prediction models can only be established if researchers apply their flutter and forced vibration predictions to a number of well documented experimental test cases. In the present report, the geometrical and time-averaged flow conditions of nine two-dimensional or quasi three-dimensional experimental standard configurations for aeroelasticity in turbomachine cascades are given. For each configuration some aeroelastic test cases are defined, comprising different incidence angles, Mach numbers, interblade phase angle, reduced frequencies, etc. Furthermore a proposal for unified nomenclature and reporting formats is included, in order to facilitate the comparison between the different experimental data and the theoretical results. Author (GRA)

N84-30298# Naval Postgraduate School, Monterey, Calif.
CHARACTERIZATION OF SUBMERGED-ARC AND GAS-METAL-ARC WELDMENTS IN hY-100 STEEL M.S. Thesis
A. E. Therrien Dec. 1983 83 p
(AD-A141939; AD-E800940) Avail: NTIS HC A05/MF A01 CSCL 13/5

Unsatisfactory weld toughness in submerged arc welded (SAW) HY-100 steel weldments precludes this process from large scale HY-100 shipbuilding production efforts. The gas metal arc welding (GMAW) process produces acceptable weldments in HY-100 steel. Optical, scanning electron and transmission electron microscopy were utilized to characterize and compare the microstructure in the last pass in each weldment for each process. The SAW weldment contains a coarse-upper bainitic microstructure and the GMAW weldment contains a martensitic structure. The cooling rate in the SAW was 42% slower than in GMAW. The SAW contained 25% more weld metal conducted and the profiles reflect significantly lower microhardness in the untempered last pass weld metal of SAW weldment, but the tempered weld metal microhardness in both weldments was measured at 250 HV. Charpy impact tests were conducted and impact transition curves were developed revealing that the SAW weldments ductile-to-brittle transition temperature was 50 deg C higher than the GMAW weldment. Author (GRA)

N84-30299# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
PARALLELISM IN MANIPULATOR DYNAMICS. REVISION M.S. Thesis
R. H. Lathrop Dec. 1983 112 p
(Contract N00014-80-C-0505)
(AD-A142515; AI-TR-754-REV) Avail: NTIS HC A06/MF A01 CSCL 06/4

This paper addresses the problem of efficiently computing the motor torques required to drive a lower-pair kinematic chain (e.g., a typical manipulator arm in free motion, or a mechanical leg in the swing phase) given the desired trajectory, i.e., the Inverse Dynamics problem. It investigates the high degree of parallelism inherent in the computations, and presents two 'mathematically exact' formulations especially suited to high-speed, highly parallel implementations using special-purpose hardware or VLSI devices. In principle, the formulations should permit the calculations to run at speed bounded only by I/O. The first presented is a parallel version of the recent linear Newton-Euler recursive algorithm. The time cost is also linear in the number of joints, but the real-time coefficients are reduced by almost two orders of magnitude. The second formulation reports a new parallel algorithm which shows that it is possible to improve upon the linear time dependency. The real time required to perform the calculations increases only as the (log 2) of the number of joints. Either formulation is susceptible to a systolic pipelined architecture in which complete sets of joint torques emerge at successive intervals of four floating-point operations. Hardware requirements necessary to support the algorithm are considered and found not to be excessive, and a VLSI implementation architecture is suggested. We indicate possible applications to incorporating dynamical considerations into trajectory planning, e.g., it may be possible to build an on-line trajectory optimizer. Author (GRA)

N84-30300# Air Products and Chemicals, Inc., Allentown, Pa.
SOLID STATE COMPRESSOR Research and Development Status Report, 1 Jan. - 31 Mar. 1984
W. A. Steyert 31 Mar. 1984 25 p
(Contract N00014-83-C-0394; DARPA Order 4746)
(AD-A142605; Res/Develop-SR-3) Avail: NTIS HC A02/MF A01 CSCL 13/7

The overall goal of this program is to develop a gas compressor which uses modern piezoelectric or electrostrictive materials in place of a magnetic type motor, these materials can exert very large forces, but have only a limited travel. The key to the successful implementation of this compressor concept is a motion amplifier which will be studied at a CPI in a one cell simulator. Prior to building the simulator which will be used primarily to study material properties, we have analyzed the elastomer requirements. The motion amplifier is an elastomer which is squeezed between two plates. The elastomer is basically incompressible; therefore, as the plates move together the elastomer will extrude from around the edges. Subcontracts were signed with CeramPhysics, Inc. and Pennsylvania State University in January. Penn State University has been exploring tape casting of long narrow ribbons of PMN:PT and PLZT type ceramic materials which will serve as the drivers. CeramPhysics, compressor system, has completed a layout of a three cell simulator. APCI completed design and fabrication of a material testing device and has been getting dynamic property data on several different elastomers. GRA

N84-30301# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
A DATA ACQUISITION AND REAL-TIME DISPLAY SYSTEM FOR TESTING A JET ENGINE COMPRESSOR Interim Report, Jan. 1980 - Jan. 1982
D. S. Leonard Mar. 1984 54 p
(AF Proj. 3066)
(AD-A142696; AFWAL-TR-83-2091) Avail: NTIS HC A04/MF A01 CSCL 13/7

A test was conducted by the Air Force Aero Propulsion Laboratory to study the performance of jet engine compressors during engine speed transients. Effective analysis of the test results required accurate, high speed data acquisition during the transients. On-line reduction and display of the performance data was desirable to improve the efficiency of the test operations. This paper describes the software that was designed and implemented to acquire and display the performance data. The software controls data acquisition and calibration equipment, provides on-line calibration of transducers, records the data, reduces and displays performance data (including graphics), and allows the test operator to control these functions. Author (GRA)

N84-30302# Bendix Corp., Kansas City, Mo.
INITIAL INSIGHTS ON ROBOTICS
L. K. Gillespie Apr. 1984 47 p refs
(Contract DE-AC04-76DP-00613)
(DE84-010768; BDX-613-3062) Avail: NTIS HC A03/MF A01

The implementation of three production robot systems and concurrent development activities on other potential applications have provided some significant insights into the state-of-the-art of robotics. Observations discussed include the impact of using state-of-the-art robots versus proven technology, the impact of part changeover, application choices, robot and vision characteristics, safety, and planning for applications. DOE

N84-30303# Oak Ridge National Lab., Tenn.
ADVANCED TELEOPERATION IN NUCLEAR APPLICATIONS: CONSOLIDATED FUEL REPROCESSING PROGRAM
W. R. Hamel, M. J. Feldman, and H. L. Martin 1984 15 p refs Presented at 21th Space Congr., Cape Kennedy, Fla., 24 Apr. 1984
(Contract DE-AC05-84OR-21400)
(DE84-011631; CONF-8404116-2) Avail: NTIS HC A02/MF A01

Development activities cover all aspects of an advanced teleoperated maintenance system with particular emphasis on a new force reflecting servomanipulator concept. The new manipulator, called the advanced servomanipulator, is microprocessor controlled and is designed to achieve force reflection performance near that of mechanical master/slave manipulators. The advanced servomanipulator uses a gear drive transmission which permits modularization for remote maintainability (by other advanced servomanipulators) and increases reliability. Human factors analysis is used to develop an improved man/machine interface concept based upon colographic displays and menudriven touch screens. Initial test and evaluation of two advanced servomanipulator slave arms and several other development components have begun. DOE

N84-30304# Argonne National Lab., Ill.
DETERMINATION OF THERMAL-DEGRADATION RATES OF SOME CANDIDATE RANKINE-CYCLE ORGANIC WORKING FLUIDS FOR CONVERSION OF INDUSTRIAL WASTE HEAT INTO POWER
M. L. Jain, J. Demirgian, J. L. Krazinski, H. Bushby, H. Mattes, and J. Purcell 15 Apr. 1984 16 p refs Presented at Ann. Indus. Energy Conservation Technol. Conf., Houston, Tex., 15 Apr. 1984
(Contract W-31-109-eng-38)
(DE84-009585; CONF-840434-1) Avail: NTIS HC A02/MF A01

Serious concerns over the long term thermal stability of organic working fluids and its effect on system performance, reliability, and overall economics have impeded widespread development and deployment of organic Rankine cycle power systems (ORCPSs) for conversion of industrial waste heat into power. Prototype systems built using thermal stability information derived from static capsule tests have often operated less than satisfactorily. Interim results of an experimental investigation undertaken to determine degradation rates (as a function of maximum cycle temperature) of four organic working fluids considered potential candidates for use in a Rankine cycle power conversion system are presented. The four fluids under investigation are: Fluorinol 85, 2-methylpyridine/water, toluene, and Freon R-113. DOE

N84-30305# Bendix Corp., Kansas City, Mo.
ROBOTIC DEBURRING. PART 1: PRELIMINARY OBSERVATIONS
L. K. Gillespie Apr. 1984 86 p refs
(Contract DE-AC04-76DP-00613)
(DE84-010766; BDX-613-3060) Avail: NTIS HC A05/MF A01

Preliminary findings about capabilities and limitations for robotic deburring of parts while maintaining 0.25 mm maximum edge breaks are described. Robotic deburring of hand size and larger parts common to many Bendix programs has unique constraints and requires careful definition of robot needs. Representative geometry considerations and robotic considerations are illustrated and defined. DOE

N84-30306# Sandia Labs., Albuquerque, N. Mex. Fluid Mechanics and Heat Transfer Division
A USERS MANUAL FOR THE LASER WELDING CODE WELD2D
Anthony J. Russo Apr. 1984 37 p refs
(Contract DE-AC04-76DP-00789)
(DE84-011167; SAND-84-0397) Avail: NTIS HC A03/MF A01

The two-dimensional laser welding code, WELD2D, was developed to model the conduction mode welding (weld pool motions are not considered) or common metals. For butt welded configurations two dissimilar materials may be used. Either Gaussian or uniform laser beam power distributions may be selected and insulated or conducting ends can be treated. Specification of the laser wavelength, energy per pulse, pulse duration and repetition rate is required as input and the temperature field and molten pool shape are calculated as functions of time. Currently material parameters for six metals, aluminum, nickel, steel, molybdenum, copper and silicon are included in the code; however, these may be modified or expanded easily with simple changes to data records. A users manual for WELD2D, a description of the models employed, code usage, and sample calculations are contained. DOE

N84-30307# Department of Energy, Washington, D. C.
DUAL ROTATING SHAFT SEAL APPARATUS Patent Application
J. Edwin Griggs and Herbert J. Newman, inventors (to DOE) Filed 16 Jun. 1983 16 p
(Contract W-7405-eng-36)

(DE84-011101; US-Patent-Appl-SN-505011) Avail: NTIS HC A02/MF A01

An apparatus is disclosed which is suitable for transferring torque and rotary motion through a wall in a manner which is essentially gas impermeable. The apparatus can be used for pressurizing, agitating, and mixing fluids and features two ferrofluidic, i.e., ferrometic seals. Each seal is disposed on one of two supported shafts and each shaft is operably connected at one end to a gear mechanism and at its other end to an adjustable coupling means which is to be connected to a rotatable shaft extending through a wall through which torque and rotary motion are to be transferred. DOE

N84-30308# Department of Energy, Washington, D. C.

ELECTRIC ARC SAW APPARATUS Patent Application

Paul R. Deichelbohrer, inventor (to DOE) Filed 8 Aug. 1983 18 p
(Contract DE-AC06-77RL-01030)
(DE84-006153; US-Patent-Appl-SN-473180) Avail: NTIS HC A02/MF A01

A portable, hand-held electric arc saw apparatus comprising a small frame for supporting an electrically conducting rotary blade which serves as an electrode for generating an electric arc between the blade and a workpiece of opposite polarity. Electrically conducting means are provided on the frame for transmitting current to the blade. A pair of freely movable endless belts in the form of crawler treads are employed to facilitate movement of the apparatus relative to the workpiece. DOE

N84-30309# Oak Ridge National Lab., Tenn. Instrumentation and Controls Div.

ADVANCEMENT OF REMOTE SYSTEMS TECHNOLOGY: PAST PERSPECTIVES AND FUTURE PLANS

W. R. Hamel and M. J. Feldman Apr. 1984 41 p refs Presented at a Top. Meeting on Robotics and Remote Handling in Hostile Environments, Gatlinburg, Tenn. 23-27 Apr. 1984
(Contract DE-AC05-84OR-21400)
(DE84-011460; CONF-840413-3) Avail: NTIS HC A03/MF A01

Remote technology under development which is expected to improve remote operations by extending the range of admissible remote tasks and increasing remote work efficiency is discussed. The 40 years of remote operating experience and the essential features of various old and new philosophies used in remote engineering are considered. A future direction based upon the Remote concept is explained, and recent progress in the development of an advanced servomanipulatory based maintenance concept is summarized to show that a new generation of remote systems capability is feasible through advanced technology. DOE

N84-30310# Northern Research and Engineering Corp., Woburn, Mass.

ENGINEERING RESEARCH ON POSITIVE DISPLACEMENT GAS EXPANDERS, PHASE 1

R. E. Lord Feb. 1984 54 p refs
(Contract DE-AC02-83CE-40652)
(DE84-008977; DOE/CE-40652/1; Rept-1514-2) Avail: NTIS HC A04/MF A01

A research, design, and development program related to positive displacement gas expanders is reported. The objective of this program is to develop and demonstrate a more cost effective gas expander for use in those waste heat recovery systems which utilize an Organic Rankine Cycle. To provide a lower cost machine, the gas expander uses a positive displacement concept, rather than a turbine as used currently. Several positive displacement machine concepts were examined, and various performance measures were developed for each of the concepts. The machine concepts were: single and multiple cylinder reciprocators, radial piston, roller piston, sliding vane, trochoidal, helical screw, and lobed rotor. For each of the concepts, designs were generated for machines operating with three different sets of operating conditions. These designs were then used to develop measures of efficiency and cost, and to examine other characteristics of the machines, such as development risk and ability to operate with different flow, pressure, and temperature levels. Based upon an evaluation of these characteristics, a specific concept was selected for further development. This concept is a double acting, single cylinder reciprocating machine with crossheads and ceramic liners. DOE

N84-30311# SKF Technology Services, King of Prussia, Pa.

MECHANICAL INTERACTIONS OF ROUGH SURFACES Progress Report, 1 Jan. - 1 Apr. 1984

John I. McCool Apr. 1984 11 p
(Contract DE-AC02-84ER-13163)
(DE84-008589; DOE/ER-13163/2) Avail: NTIS HC A02/MF A01

The computerized roughness processing system performed using a precision sinusoidal specimen is described. An expository paper on the elastic contact of rough surfaces has been drafted and is descried. The test of a reply to a discussion of a recently presented paper is given. DOE

N84-30312# California Univ., Livermore. Lawrence Livermore Lab.

MODELING CHEMICAL KINETIC ASPECTS OF ENGINE KNOCK

William J. Pitz and Charles K. Westbrook 20 Mar. 1984 25 p refs Presented at the Spring Meeting of the Western States Section of the Combustion Inst., Boulder, Colo. 2-3 Apr. 1984
(Contract W-7405-eng-48)
(DE84-009874; UCRL-90577; CONF-8404104-2) Avail: NTIS HC A02/MF A01

A chemical kinetics oxidation mechanism for n-butane was employed to study hydrocarbon autoignition related to engine knock. A low temperature submechanism was added to a previously developed high temperature reaction paths in autoignition. A series of calculations follows reactions which place in a sample of end gas that is subjected to the pressure and temperature history observed in an actual engine. Predicted autoignition times compare very well those experimentally measured. Inclusion of a low temperature submechanism did not affect the predicted autoignition times. Controlling chemical reaction paths are identified. It is found that all ignitions practicularly sensitive to reactions which involve the production and consumption of HO2. DOE

N84-30313# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Equipment Engineering Dept.

UPSET WELD STUDY FOR JOINING 304L STAINLESS STEEL TUBES

W. R. Kanne, Jr. Mar. 1984 38 p refs Presented at the 65th Ann. Am. Welding Soc. Convention, Dallas, 9 Apr. 1984
(Contract DE-AC09-76SR-00001)
(DE84-011507; DP-MS-83-123; CONF-840448-4) Avail: NTIS HC A03/MF A01

Tube samples made from bar and forgings were joined using resistance upset welding technique. Effects of joint design, based metal strength, and weld schedule on metal and final microstructure were determined. Studies of the effects of joint design on weld quality permitted selection of an optimum design. Welds joining tubes of four strengths showed that weld centerline hardness is independent of initial material hardness and is greater than that of fusion welds. It was shown that a wide range of welding parameters produces satisfactory welds. Bar stock was used for additional studies. Force and current ranges, improved weld quality, are determined and welding in air is demonstrated. DOE

N84-30314# Hanford Engineering Development Lab., Richland, Wash.

STRATEGIES FOR ANALYTICAL APPLICATIONS AND IMPLEMENTATION OF A MULTI-PURPOSE LABORATORY ROBOT

D. L. Baldwin Apr. 1984 23 p Presented at the LABCON West Conf., Long Beach, Calif., 8-10 May 1984
(Contract DE-AC06-76FF-02170)
(DE84-012379; HEDL-SA-3077-FP; CONF-8405161-1) Avail: NTIS HC A02/MF A01

The automation of the analytical chemistry laboratory has progressed steadily in recent years and in many different directions.

The relatively well established areas of automation, such as microprocessor controlled instruments and data aquisition equipment, are generally found throughout most laboratories. This equipment is designed to automate one portion of a procedure or a single step of an analysis, which leaves the entire remainder of a procedure unautomated and an area for improvement. DOE

N84-30315# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Afdeling Technische Menskunde.
ORIENTATION OF ERGONOMIC ASPECTS OF THE UNIVERSAL DYNAMOMETER DEVICE
J. Lombaers Dec. 1983 35 p refs In DUTCH; ENGLISH summary
(Contract A79/KL/131)
(IZF-1983-25; TDCK-79065) Avail: NTIS HC A03/MF A01

The ergonomic aspects of the Universal Dynamometer Device of the Army Test Center 2 at Huybergen are discussed. The device is used to test the power of vehicles. The components and the use of the device, the shortcomings of the present situation, and the ergonomic aspects of the proposed modifications are described. Ergonomic recommendations that can be elaborated in subsequent stages of the project are given. Author (ESA)

N84-30316# Prins Maurits Lab. TNO, Rijswijk (Netherlands).
THE PENETRATION MODEL OF DEHN [HET PENETRATIEMODEL VAN DEHN]
M. W. vanRijswijk Sep. 1983 110 p refs In DUTCH; ENGLISH summary
(Contract A79/KL/130)
(PML-1984-5; TDCK-79153) Avail: NTIS HC A06/MF A01

Interaction between a projectile and a target during impact was investigated using the Dehn penetration model. This semiempirical analytical model describes the penetration of a projectile in a target plate by a mass point in a force field. Model parameters can be used as criteria for the occurrence of the interaction processes of ricochet, penetration or perforation. Velocity and direction of projectiles after perforation, and time and depth of penetration are calculated as a function of velocity and impact angle. Modeling of possible projectile mass erosion within this model is discussed. Computational results are compared with experimental values. The most important computer programs are enclosed. Author (ESA)

N84-30317# European Space Agency, Paris (France).
EUROPEAN SPACE TRIBOLOGY LABORATORY: FACILITIES, SERVICES, CAPABILITIES
W. R. Burke, ed. Mar. 1984 27 p refs Original contains color illustrations
(ESA-BR-12; ISSN-0250-1589) Avail: NTIS HC A03/MF A01

The functions and facilities of the European Space Tribology Laboratory (ESTL) are described. The ESTL subjects mechanisms to simulated space conditions; it operates a liquid and dry lubrication service for space mechanism components; and provides consultancy on all aspects of space tribology and mechanism design. Author (ESA)

N84-30318# Technical Research Centre of Finland, Espoo. Metals Lab.
FRICTION IN LOW SPEED LUBRICATED ROLLING AND SLIDING CONTACTS Ph.D. Thesis - Helsinki Univ.
Kenneth Holmberg Apr. 1984 86 p refs
(VTT-16; ISBN-951-38-2014-9; ISSN-0358-5069) Avail: NTIS HC A05/MF A01

A four-disk machine for friction measurements at low speed lubricated rolling and sliding contacts was built. Values for the coefficient of friction in the range of 0.03 to 0.11 were measured. In conditons of pure rolling at low speeds the lubricant and its additive content have considerable influence on friction because of a deforming or mangling effect of the boundary lubricant film in the inlet region of the contact. The rolling speed significantly, influences rolling friction, whereas the disk material combination slightly influences rolling friction. No appreciable influence of load, lubricant viscosity or surface roughness on the coefficient of rolling friction was found. Author (ESA)

N84-30319# Commerce Dept., Washington, D.C.
FLEXURE HINGE Patent Application
Frederic E. Scire and E. Clayton Teague, inventors (to Dept. of Commerce) Filed 21 Feb. 1984 19 p
(PB84-178557; US-Patent-Appl-SN-581831) Avail: NTIS HC A02/MF A01 CSCL 13E

The present invention relates to improved flexure devices as well as to the use of such devices in instrument stages capable of independent movement in each of two orthogonally/related dimensions. More particularly, the invention relates to an instrument stage having an output device form capable of independent xy motion in a single plane and which is virtually free of pitch, roll and yaw and of motion perendicular to the plane of motion. GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N84-30320# Dayton Univ., Ohio.
FLAW DETECTION RELIABILITY CRITERIA. VOLUME 1: METHODS AND RESULTS Final Technical Report, May 1982 - Sep. 1983
A. P. Berens and P. W. Hovey Apr. 1984 170 p
(Contract F33615-82-C-5030)
(AD-A142001; UDR-TR-83-137-Vol-1; AFWAL-TR-84-4022-Vol-1)
Avail: NTIS HC A08/MF A01 CSCL 14/2

Air Force inspection limits for damage tolerance analyses have been defined as those crack lengths for which there is 95 percent confidence that at least 90 percent of all cracks will be detected. This definition of inspection limit cannot be used in structural risk assessments as it is not linked to the probability of missing the flaws that may be present in a structure. This program investigated alternate methods of defining flaw detection reliability criteria and, in particular, focuses on a characterization based on a fixed probability of having cracks greater than the inspection limit after the inspection. A major part of the program was devoted to methods of estimating the POD (Probability of Crack Detection) function from inspection reliability demonstration experiments. These methods are extensively discussed. Author (GRA)

N84-30321# NDT Technologies, Inc., South Windsor, Conn.
ELECTROMAGNETIC INSPECTION OF WIRE ROPES USING SENSOR ARRAYS Quarterly Progress Report, 16 Dec. 1983 - 15 Mar. 1984
H. R. Weischedel 25 Apr. 1984 7 p
(Contract N00014-83-C-0484)
(AD-A142012) Avail: NTIS HC A02/MF A01 CSCL 14/2

During the time period from 16 December 1983 thru 15 March 1984 we achieved the following: We performed an experimental investigation of the magnetic flux patterns in the magnetizer-sensor arrangement and in the wire rope. This investigation led to a better understanding of the previously mentioned echo effect. We investigated a number of different magnetizer-sensor configurations using split-pole arrangements and various pole pieces with different geometries. At the present time, it appears that the use of longer and narrower pole pieces and elongated magnet geometries significantly reduce the previously mentioned remagnetization effect. We modified our coil simulation program to include the interaction of coils and magnetizer for our new loss-of-metallic-area instruments. The simulated results are in excellent agreement with the above mentioned experimental results. The simulation program now allows an accurate prediction of the instrument performance. Unfortunately, the simulation will not predict the signal-to-noise ratio at the present time. GRA

N84-30322# Institute for Defense Analyses, Alexandria, Va. Science and Technology Div.

R AND M (RELIABILITY AND MAINTAINABILITY) PROGRAM REVIEW ELEMENTS DOCUMENT (IDA/OSD R AND M (INSTITUTE FOR DEFENSE ANALYSES/OFFICE OF THE SECRETARY OF DEFENSE RELIABILITY AND MAINTAINABILITY) STUDY Final Report, Jul. 1982 - Aug. 1983

P. F. Goree and T. A. Musson Aug. 1983 64 p
(Contract MDA903-79-C-0018)
(AD-A142073; AD-E500642; IDA-D-26; IDA/HQ-83-25936) Avail: NTIS HC A04/MF A01 CSCL 15/3

This document describes in detail how weapon systems' development programs should be structured for reliability and maintainability. Not only are the key elements identified but they are defined, and key questions relative to those elements are addressed. GRA

N84-30323# Pacific Northwest Lab., Richland, Wash.

QUALIFICATIONS OF ULTRASONIC TESTING FOR NUCLEAR INSERVICE INSPECTION APPLICATIONS

T. T. Taylor, S. R. Doctor, F. A. Simonen, and J. C. Spanner (Spanner Engineering, Richland, Wash.) Mar. 1984 5 p refs Presented at the 13th Ann. ASME Conf., San Antonio, 23-26 Apr. 1984
(Contract DE-AC06-76RL-01830)
(DE84-011899; PNL-SA-12192; CONF-8404160-1) Avail: NTIS HC A02/MF A01

The criteria and requirements for qualifying ultrasonic testing for inservice inspection (UT/ISI) of nuclear reactor components are discussed. The proposed qualification requirements are in addition to, but not a replacement for, the applicable requirements in ASME Section XI. The criteria and requirements are applicable to UT personnel, equipment, and procedures. The philosophy of the qualification processes and its implications to the nuclear industry are described. DOE

N84-30324# Loughborough Univ. of Technology (England). Dept. of Mathematics.

INFERENCE BASED ON RANKS WITH MULTIPLE FAILURE TIME OR GROUPED SURVIVAL DATA

A. N. Pettitt Apr. 1984 17 p refs
(Maths-Res-177) Avail: NTIS HC A02/MF A01

Methods based on ranks using scores modified for ties to provide efficient and relatively simple regression analysis of survival data where there are multiple failures are presented. Since the techniques use ranks of observations, there is no need to specify any transformation of the survival times before a model is fitted, so they are robust against such transformation mis-specification. Author (ESA)

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N84-30325 United Kingdom Atomic Energy Authority, Risley (England).

SOLVING CRACK PROBLEMS WITH ANALYTICAL TECHNIQUES AND THE FINITE ELEMENTS METHOD

C. Mattheck and P. Morawietz 5 Apr. 1984 12 p refs Transl. into ENGLISH from KFK Nachr. (West Germany), v. 15, no. 4, 1983 p 353-358
(BLL-Risley-Tr-4940-(9091.9F)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The determination of stress intensity factors by the finite element method and by the weighted function method was described. The following specific applications of these methods were discussed: (1) semielliptical surface crack in a plate, (2) an external circumferential crack in a solid cylinder, and (3) simulation of plastic cracking problems. R.S.F.

N84-30326 United Kingdom Atomic Energy Authority, Risley (England).

CALCULATION OF CRACK BEHAVIOUR ON EXPOSURE TO THERMAL SHOCK

H. Stamm 5 Apr. 1984 14 p refs Transl. into ENGLISH from KFK Nachr. (West Germany), v. 15, no. 5, 1983 p 346-352
(BLL-Risley-Tr-4941-(9091.9F)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

Failures in light water reactors (LWR) necessitating emergency cooling involve the surface of parts of the reactor pressure vessel or pipe system of the primary circuit being brought into contact with cold feedwater, thus causing the phenomenon of thermal shock. The essential elements of crack propagation calculation described herein, with particular emphasis, were placed on thermal fatigue. The propagation of a surface crack in a circular steel plate was used as a example to demonstrate the method of calculation. The stress intensity factors were calculated by the weighted functions method. R.S.F.

N84-30327 Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).

RING-TYPE SUPPORT CONCEPT FOR TWISTED COILS (FINITE ELEMENT SIMULATION)

S. B. Mukherjee Feb. 1984 57 p refs
(IPP-2/271) Copyright. Avail: Issuing Activity

Modular stellarator coil systems of the Wendelstein VII-AS type with reactor dimensions are investigated. Finite element computations show that using a ring-type support concept (an inward or an outward type), considerably reduces mechanical stresses within a coil under magnetic loads compared with the front support concept due to drop of the bending moments within a twisted coil. A ring-type inward support of a coil takes up radial forces within the coil directly, and the coil expands radially outward. With the ring-type outward support, radial forces pass through the coil into the outward support structure, leading to the radial compression of the coil. Deflection is low. The computations assumed a superconducting coil, so no temperature rise within a coil is considered. Forces and stresses resulting from cooling down and different thermal expansion coefficients are not treated. Author (ESA)

N84-30328*# Astro Research Corp., Carpinteria, Calif.

SUPPORT STRUCTURES FOR LARGE INFRARED TELESCOPES Final Report

John M. Hedgepeth Washington NASA Jul. 1984 47 p refs
(Contract NAS1-16923)
(NASA-CR-3800; NAS 1.26:3800; ARC-TN-1121) Avail: NTIS HC A03/MF A01 CSCL 20K

An infrared telescope requires an accuracy of its reflecting surfaces of less than a micrometer. Future missions may require such accuracy from telescopes that are 20 meters or larger in diameter. The structure for supporting such a telescope will most probably take the form of a deep truss. Various approaches for constructing the primary mirror in space are illustrated. One that employs automated deployment of interconnected reflector-structure modules was described in detail. Estimates were made of the precision obtainable with properly configured truss structures and the required ability of active control systems for achieving the desired accuracy. Author

N84-30329*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

IMPROVED METHODS OF VIBRATION ANALYSIS OF PRETWISTED, AIRFOIL BLADES

K. B. Subrahmanyam and K. R. V. Kaza 1984 37 p refs Presented at the 16th Intern. Congr. of Theoretical and Appl. Mech., Lyngby, Denmark, 19-25 Aug. 1984; sponsored by the International Union of Theoretical and Applied Mechanics and the Technical Univ. of Denmark
(NASA-TM-83735; E-2175; NAS 1.15:83735) Avail: NTIS

HC A03/MF A01 CSCL 20K

Vibration analysis of pretwisted blades of asymmetric airfoil cross section is performed by using two mixed variational approaches. Numerical results obtained from these two methods are compared to those obtained from an improved finite difference method and also to those given by the ordinary finite difference method. The relative merits, convergence properties and accuracies of all four methods are studied and discussed. The effects of asymmetry and pretwist on natural frequencies and mode shapes are investigated. The improved finite difference method is shown to be far superior to the conventional finite difference method in several respects. Close lower bound solutions are provided by the improved finite difference method for untwisted blades with a relatively coarse mesh while the mixed methods have not indicated any specific bound. Author

N84-30330*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

METHODS FOR ANALYSIS OF CRACKS IN THREE-DIMENSIONAL SOLIDS

I. S. Raju and J. C. Newman, Jr. Jul. 1984 69 p refs
(NASA-TM-86266; NAS 1.15:86266) Avail: NTIS HC A04/MF A01 CSCL 20K

Various analytical and numerical methods used to evaluate the stress intensity factors for cracks in three-dimensional (3-D) solids are reviewed. Classical exact solutions and many of the approximate methods used in 3-D analyses of cracks are reviewed. The exact solutions for embedded elliptic cracks in infinite solids are discussed. The approximate methods reviewed are the finite element methods, the boundary integral equation (BIE) method, the mixed methods (superposition of analytical and finite element method, stress difference method, discretization-error method, alternating method, finite element-alternating method), and the line-spring model. The finite element method with singularity elements is the most widely used method. The BIE method only needs modeling of the surfaces of the solid and so is gaining popularity. The line-spring model appears to be the quickest way to obtain good estimates of the stress intensity factors. The finite element-alternating method appears to yield the most accurate solution at the minimum cost. Author.

N84-30331*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FATIGUE AND FRACTURE BRANCH: A COMPENDIUM OF RECENTLY COMPLETED AND ON-GOING RESEARCH PROJECTS

Wolf Elber Jun. 1984 76 p
(NASA-TM-85825; NAS 1.15:85825) Avail: NTIS HC A05/MF A01 CSCL 20K

This compendium of recently completed and ongoing research projects from the Fatigue and Fracture Branch at NASA Langley Research Center provides technical descriptions and key results of all such projects expected to lead to publication of significant findings. The common thread to all these studies is the application of fracture mechanics analyses to engineering problems in metals and composites, with particular emphasis on airframe structural materials. References to recent publications are included where appropriate. Author

N84-30332# Materials Research Labs., Melbourne (Australia).

THE EFFECT OF INJECTION MOLDING PROCESSING PARAMETERS ON THE ENVIRONMENTAL STRESS CRACKING RESISTANCE OF POLYCARBONATE MOLDINGS

R. J. Roseblade Aug. 1983 29 p refs
(MRL-R-924; AR-003-906) Avail: NTIS HC A03/MF A01

The effect of injection molding processing variables on the environmental stress cracking performance of Lexan polycarbonate grades 121 and 101 was studied. Grade 121 is a general purpose, easy flowing grade while grade 101 is a high viscosity, high molecular weight grade. A solution of 50:50 by volume toluene/isooctane was applied as a stress cracking agent and a tensile impact tester was used to determine the strength of the moldings after immersion in the solvent. For Lexan 121, the combination of a heated die (80 C) and a long cycle time (38 sec) produced moldings with superior environmental stress cracking resistance compared to a cycle where the die temperature was 18 C and the cycle time 26 to 27 sec. For Lexan 101, use of the minimum recommended barrel temperature profile resulted in moldings with superior environmental stess cracking resistance compared to those produced by a cycle using maximum temperature settings. However, if a low injection speed was used in combination with the high temperature settings, then moldings with a comparable performance to those from the low temperature cycle were produced. Author

N84-30333# Aeronautical Research Labs., Melbourne (Australia).

STRAINS IN AN ELASTIC PLATE CONTAINING AN INTERFERENCE-FIT BOLT NEAR A FREE EDGE

G. S. Jost and R. P. Carey 1984 30 p
(AR-003-012; ARL-STRUC-Rept-400) Avail: NTIS HC A03/MF A01

The elastic stresses in a semi-infinite plate with a pressurized hole are derived, along with the relationship between the interface pressure and interference. Approximate average radial expansion of the hole with radial bolt contraction is calculated. The location of the onset of yielding is ascertained. Strain level is used to determine yield incipience. Agreement between predicted and measured strains is good. The approximation to relate average bolt/hole interface pressure to interference for the present non-axisymmetric case is very successful. S.B.

N84-30334*# Failure Analysis Associates, Palo Alto, Calif.

TECHNIQUES FOR FATIGUE LIFE PREDICTIONS FROM MEASURED STRAINS Interim Report

Robert Sire, Philip Resuner, Craig Schnoof, and Jerrell Thomas Jul. 1984 136 p refs
(NASA-CR-171118; NAS 1.26:171118; FAA-I-84-6-1; PA09746/RAS:R-9746) Avail: NTIS HC A07/MF A01 CSCL 20K

Fatigue life prediction techniques for components of the space shuttle main engine were investigated. A cycle-by-cycle (CBC) fatigue damage model was developed which uses experimental strain histories to predict the relative impact that variations in engine operating parameters have on fatigue life. The damage model was used to evaluate the relative fatigue lives for 37 different LOX-post strain histories covering four strain gages, in two tests, at four steady-state power levels. Power spectral density (PSD) and root-mean-square (RMS) signal strength were calculated to determine stationarity for each strain history and each history subset. A second fatigue damage model based on RMS strain was developed and resulting predictions were compared with those from the CBC model. The results of the comparison were used to make recommendations regarding acquisition of strain data from engine tests. M.G.

N84-30335# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.

TENSILE CRACK EXPOSURE TESTS. STATISTICAL ANALYSIS OF THE LONG-TERM DURABILITY OF SERIES B BEAMS

H. T. Thornton, Jr. Mar. 1984 72 p
(AD-A141955; WES-TM-6-412-4; Rept-4) Avail: NTIS HC A04/MF A01 CSCL 13/3

In November 1954, a long-term durability program was begun to determine the effects of severe natural weathering on reinforced concrete beams loaded to different stress levels and containing reinforcing steel with different types of bar deformation in either top-as-cast or bottom-as-cast positions. The beams were fabricated, cured, and loaded at the U.S. Army Engineer Waterways Experiment Station (WES) in 1954, then shipped to Eastport, Marine, and placed on the beach at the natural weathering exposure station on the south side of Treat Island in Cobscook Bay. The beams were subjected to twice daily tidal cycles exposing them to wetting under considerable head and drying to surface dry conditions. In addition, during the winter months, the beams were subjected to cycles of freezing and thawing with each tide when the air temperature was at or below 28 deg F (-2.2 deg C). The beams were inspected annually during the exposure period and evaluated by a team of inspectors rating the degree of deterioration. Nondestructive tests were also performed. Each year data on condition, percent velocity squared (v2), and maximum crack width were collected. GRA

N84-30336# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
EFFECTS OF VARIATIONS IN COLDWORKING REPAIR PROCEDURES ON FLAW GROWTH AND STRUCTURAL LIFE Final Report, Nov. 1979 - Dec. 1980
J. M. Pearson-Smith and J. M. Potter Apr. 1984 29 p
(AD-A141966; AFWAL-TR-82-3030) Avail: NTIS HC A03/MF A01 CSCL 01/3

Out-of-tolerance cold hole expansion can occur during scheduled maintenance of aircraft structures. Personnel responsible for the maintenance of aircraft structures must make decisions as to the acceptability of any deviation from repair specifications. The decision to accept or reject an out-of-tolerance repair can be significant in a scheduled maintenance situation since a rejection will normally involve a major integral component of structure. A rejection of a discrepant hole at the repair stage can mean scrapping of the component with the potential of thousands of person-hours for replacement and refurbishment. The purpose of this research effort was to investigate the effect of out-of-tolerance cold hole expansion on flaw growth and structural life. To accomplish this goal, specimens were prepared and fatigue tested under spectrum loading conditions to failure. Typical discrepancies found in structures undergoing repair were simulated for this effort. Crack length measurements were periodically obtained during the spectrum test and the resultant fatigue lives were noted. Crack growth behavior and fatigue lives for the holes with discrepant preparation were compared to those of properly prepared specimens. GRA

N84-30337# Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
NASTRAN ANALYSIS COMPARISON TO SHOCK TUBE TESTS USED TO SIMULATE NUCLEAR OVERPRESSURES Final Report, 1 Oct. 1983 - 30 Apr. 1984
T. K. Wheless May 1984 56 p
(AF Proj. AFS-D)
(AD-A142290; ASD-TR-84-5006; ASD-ENSS-84-1) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report presents a study of the effectiveness of the NASTRAN computer code for predicting structural response to nuclear blast overpressures. NASTRAN's effectiveness is determined by comparing results against shock tube tests used to simulate nuclear overpressures. Seven panels of various configurations are compared in this study. Panel deflections are the criteria used to measure NASTRAN's effectiveness. This study is a result of needed improvements in the survivability/vulnerability analyses capabilities of weapon systems subjected to nuclear blast. Author (GRA)

N84-30338# Xerox Palo Alto Research Center, Calif.
VIBRATIONAL STUDIES OF THE STRUCTURE OF DISORDERED SOLIDS Final Report, 15 Jul. 1980 - 14 Mar. 1984
F. L. Galeener 14 Mar. 1984 12 p
(Contract N00014-80-C-0713)
(AD-A142297; AD-E750179) Avail: NTIS HC A02/MF A01 CSCL 20/11

The goal of this program was to further improve our understanding of the vibrational excitations of disordered solids, and to use this knowledge to elucidate the structure of glasses and amorphous thin films. Much significant progress has been made, utilizing Raman, infrared and inelastic neutron scattering experiments, supplemented by novel theoretical work on central force network models and dihedral angle averaged Bethe lattices. Particularly important were the discovery of regular rings of bonds as dominant defects in the otherwise disordered structure of amorphous SiO2, and the unveiling of simple Raman selection rules for amorphous networks. Twenty two scientific papers have been published, and several more are in the process of completion. GRA

N84-30339# Brown Univ., Providence, R. I.
ELASTIC-PLASTIC DEFORMATION OF PULSE-LOADED STRUCTURES Final Technical Report, Oct. 1981 - Sep. 1983
H. Kolsky and P. S. Symonds Apr. 1984 12 p
(Contract N00014-82-K-0063)
(AD-A142350) Avail: NTIS HC A02/MF A01 CSCL 20/11

The research aimed to provide a simple but realistic approximation technique for the plastic deformation and maximum deflection of a structure subjected to a general pulse loading. We are considering structures such a beams, frames, plates, and shells; of ductile metal either rate independent or rate sensitive (steel, titanium). Other materials such as reinforced or pre-stressed concrete and fibre-reinforced materials, may be treated by extensions of the new methods. The work has been concerned with the analysis of deformations due to force pulses of general shape, finite duration, and force magnitudes ranging from near the static collapse value to several multiples of this. The work has involved (a) laboratory experiments, (b) complete finite element numerical solutions by ABAQUS, and (c) the extension of the three-stage simplified elastic-plastic approach to such problems. GRA

N84-30340# Princeton Univ., N. J. Dept. of Civil Engineering.
NONLOCAL CONTINUUM THEORY FOR DISLOCATION AND FRACTURE
A. C. Eringen Apr. 1984 22 p
(Contract N00014-83-K-0126)
(AD-A142538; Rept-84-SM-2; TR-61) Avail: NTIS HC A02/MF A01 CSCL 20/11

By means of linear theory of nonlocal elasticity, solutions are given for some Voltera dislocations situated in an elastic solid. The stress fields are determined for screw and edge dislocations. The stresses and elastic energy are devoid of usual singularities predicted by the classical (local) elasticity. A theory is developed for continuous distributions of dislocations on the basis of nonlocal incompatible elasticity. Stress fields are given for volume, surface and line distributions of dislocations. Celebrated Peach-Koehler formula is modified to include nonlocal Green's functions. The stress fields for three- and two-dimensional cases and for the anti-plane strain are determined for line distributions. Calculations are carried out for the uniform distributions of edge and screw dislocations along a straight line segment. By means of the maximum stress hypothesis, a fracture criteria is introduced. Calculated theoretical strengths are in good agreement with those based on the atomic models. Reduction of material strength with the presence of dislocation line and the maximum number of dislocations are given. Author (GRA)

N84-30341# Johns Hopkins Univ., Baltimore, Md.
A NEW OPTICAL TECHNIQUE FOR RAPID DETERMINATION OF CREEP AND FATIGUE THRESHOLDS AT HIGH TEMPERATURE Final Report, Jan. 1981 - Jan. 1984
W. N. Sharpe, Jr. Wright-Patterson AFB, Ohio AFWAL Apr. 1984 109 p
(Contract F33615-81-K-5014)
(AD-A142675; AFWAL-TR-84-4028) Avail: NTIS HC A06/MF A01 CSCL 20/11

A laser-based interferometric displacement gage was used to measure crack opening displacements very near the tips of fatigue precracks. The test material was Inconel 718 and the temperature 650C. Creep and fatigue cracking thresholds were determined in times as short as one-half hour and found to be approximately 11 MPa-m to the 1/2 power in both cases. Details of the measurement technique as well as of the displacements measured near the tip are given. Author (GRA)

N84-30342# Sandia Labs., Albuquerque, N. Mex.
METHOD FOR DEFINING THE DISTRIBUTION OF TRIAXIAL STRESS STATES IN UNDERGROUND STRUCTURES
B. M. Butcher and J. P. Hill Feb. 1984 22 p refs

(Contract DE-AC04-76DP-00789)
(DE84-010591; SAND-83-2506) Avail: NTIS HC A02/MF A01

A method for defining the distribution of triaxial stress states in three dimensional underground structures is described. The reason for interest in the degree of triaxiality is that one of the ways to evaluate how well a particular constitutive model correctly predicts stress states in the underground structure is by comparison with laboratory results, i.e., laboratory tests should be undertaken which simulate as closely as possible the dominant triaxial stress paths and end states the underground structure is likely to encounter during service. The dominant triaxial states of a particular application must be defined to permit constitutive model evaluation. The method is illustrated by examination of the solution from a preliminary stress analysis of a complex drift configuration at the bottom of a deep shaft in a proposed underground testing facility. In this example the dominant triaxial states depend very strongly on the assumed in situ stress state and are quite distinct from stress states normally considered in laboratory testing. A method of showing the distribution of stress states and how this information can be used to plan a constitutive model development program are discussed. DOE

N84-30343# Earthquake Engineering Research Inst., Berkeley, Calif.
EFFECTS OF BOND DETERIORATION ON HYSTERETIC BEHAVIOR OF REINFORCED CONCRETE JOINTS
F. C. Filippou, E. P. Popov, and V. V. Bertero Aug. 1983 215 p refs
(Grant NSF CEE-81-07217)
(PB84-192020; UCB/EERC-83/19; NSF/CEE-83032) Avail: NTIS HC A10/MF A01 CSCL 13M

The development of an analytical model which describes the hysteretic behavior of reinforced concrete beam-column joints is considered. The model takes into account the interaction of reinforcing steel and surrounding concrete through bond and the deterioration of such interaction under cyclic deformation reversals. The cyclic deterioration of bond results in relative slippage of reinforcing bars with respect to concrete thus giving rise to significant concentrated rotations at the beam-column interface. The model is presented for interior joints, its extension to exterior joints and girder inelastic regions is indicated. GRA

N84-30344# California Univ., Livermore. Lawrence Livermore Lab.
RELIABILITY ANALYSIS FOR STIFF VERSUS FLEXIBLE PIPING
Stephen C. Lu 2 Mar. 1984 13 p refs Presented at the Symp. on Adv. in Probabilistic Struct. Mech., San Antonio, 17-21 Jun. 1984; sponsored by ASME
(Contract W-7405-eng-48)
(DE84-008325; UCRL-90509; CONF-840632-1) Avail: NTIS HC A02/MF A01

A confirmatory piping reliability assessment for stiff versus flexible piping systems indicated that removing rigid supports tends to reduce thermal stress but to increase seismic stress in the pipe. It is shown that piping and design can be made more reliable by some reduction of rigid supports. It is noted that piping design using snubbers among support devices may not exhibit the intended reliability because snubbers often fail to perform the desired function. It is demonstrated that certain piping systems with snubbers removed actually exhibit higher reliability than those of the original design. DOE

N84-30345# Department of Energy, Washington, D. C.
SHOCK WAVE ABSORBER HAVING APERTURED PLATE Patent Application
Yong W. Shin, Arne H. Wiedermann, and Carl E. Ockert, inventors (to DOE) Filed 26 Aug. 1983 22 p
(Contract W-31-209-eng-38)
(DE84-011271; US-Patent-Appl-SN-526765) Avail: NTIS HC A02/MF A01

The shock or energy absorber disclosed herein utilizes an apertured plate maintained under the normal level of liquid flowing in a piping system and disposed between the normal liquid flow path and a cavity pressurized with a compressible gas. The degree of openness (or porosity) of the plate is between 0.01 and 0.60. The energy level of a shock wave travelling down the piping system thus is dissipated by some of the liquid being jetted through the apertured plate toward the cavity. The cavity is large compared to the quantity of liquid jetted through the apertured plate, so there is little change in its volume. The porosity of the apertured plate influences the percentage of energy absorbed. DOE

N84-30346# Sandia Labs., Albuquerque, N. Mex.
INSTRUMENTING AND INTERPRETING THE TIME-VARYING RESPONSE OF STRUCTURAL SYSTEMS
P. L. Walter 1984 23 p refs Presented at the 5th Intern. Congr. on Experimental Mech., Montreal, 10 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-009067; SAND-83-1766C; CONF-8406101-1) Avail: NTIS HC A02/MF A01

The dynamic testing performed on structural systems sometimes lacks specific objectives. In addition, the design of the measurement system intended to record the resultant data often does not receive adequate attention. The rationale for performing dynamic testing is presented and insight for selecting transducers is provided and their mounting locations to measure the resultant structural motion are determined. Response measurements from transducers mounted on a freely-suspended bar structure are illustrated and explained. These results are generalized to more complex structures comprised of rod, plate, bar, and shell elements of varying geometries, boundary conditions, and materials. DOE

N84-30347# Department of Energy, Washington, D. C.
METHOD AND APPARATUS FOR MEASURING STRESS Patent Application
R. Bruce Thompson, inventor (to DOE) Filed 28 Jul. 1983 18 p
(Contract W-7405-eng-82)
(DE84-011035; US-Patent-Appl-SN-518243) Avail: NTIS HC A02/MF A01

A method and apparatus for determining stress in a material independent of microstructural variations and anisotropies is discussed. The method comprises comparing the velocities of two horizontally polarized and horizontally propagating ultrasonic shear waves with interchanged directions of propagation and polarization. The apparatus for carrying out the method comprises periodic permanent magnet-electromagnetic acoustic transducers for generating and detecting the shear waves and means for determining the wave velocities. DOE

N84-30348# Sandia Labs., Albuquerque, N. Mex. Thermomechanical and Physical Div.
DEVELOPMENT OF A HIGH-PRESSURE QUASI-ISENTROPIC PLANE WAVE GENERATING CAPABILITY
L. M. Barker and D. D. Scott May 1984 47 p refs
(Contract DE-AC04-76DP-00789)
(DE84-011619; SAND-84-0432) Avail: NTIS HC A03/MF A01

A technique for generating quasi isentropic compressive waves in condensed materials is described. The method uses a pillow impactor to cushion the impact that creates the wave. Uniaxial strain compression is produced for ease of data analysis, and the method can generate waves over a very wide range of peak stresses, including multi megabar waves. A number of facets of the technique are discussed, such as input wave risetimes, simultaneous shock up concepts, pillow spall tendencies, and data analysis techniques. Using the new technique on aluminum has resulted in new experimental support for recent theories on localized shear heating during dynamic loading. The fabrication of the pillow impactors is described and pillow quality control tests is discussed. DOE

N84-30349# Los Alamos Scientific Lab., N. Mex.
CRITERION FOR QUASIBRITTLE CRACK GROWTH
L. G. Margolin and B. W. Smith 1984 11 p refs Presented at the 25th US Symp. on Rock Mech., Evanston, Ill., 25-27 Jun. 1984

(Contract W-7405-eng-36)
(DE84-010052; LA-UR-84-829; CONF-840633-9) Avail: NTIS HC A02/MF A01

Method to predict the onset of growth of a crack in a quasibrittle material was derived. An energy criterion essentially equivalent to the fist two laws of thermodynamics is employed. The criterion is applied to the elastic-plastic crack of Olesiak and Wnuk. E.A.K.

N84-30350# Brown Univ., Providence, R. I. Div. of Engineering.
COMPARISON OF METHODS FOR CALCULATING ENERGY RELEASE RATES
F.-Z. Li, C. F. Shih, and A. Needleman Feb. 1984 44 p refs
(Contract DE-AC02-80ER-10556)
(DE84-012231; DOE/ER-10556/98) Avail: NTIS HC A03/MF A01

Two methods for calculating the energy relesed during quasi-static crack advance were compared. One method is based on a surface integral expression for the energy release rate, while the other method is based on a volume integral representation. A concise derivation of the volume integral expression is given using a virtual work type identity for Eshelby's energy momentum tensor. The finite element implementation of the volume integral formulation corresponds to the virtual crack extension method. A procedure for calculating pointwise values of the energy release rate along a three dimensional crack front is outlined. Numerical examples are presented for a fully plastic plane strain edge cracked panel subject to combined tension and bending. DOE

N84-30351# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
SOME COMPUTATIONAL ASPECTS OF THE STABILITY ANALYSIS OF NONLINEAR STRUCTURES
E. Riks 21 Mar. 1981 81 p refs Presented at 2nd Intern. Conf. on Finite Elements in Nonlinear Mech. (FENOMECH), Stuttgart, 25-28 Aug. 1981 Revised
(NLR-MP-82034-U) Avail: NTIS HC A05/MF A01

The perturbation method and the continuation method for the solution of finite element equations that describe instability phenomena are discussed. The discrete analog of Koiter's perturbation method and modifications proposed for use in nonlinear finite element codes are assessed. Continuation strategies for the computation of equilibrium paths along equilibrium surfaces are considered. The importance of adaptive parametrization is stressed. Problems related to the evaluation of the stability properties of the solutions, including determination of critical points along the solution curves and a strategy for branch switching at bifurcation points, are treated. Author (ESA)

N84-30352# Kema (N. V.), Arnhem (Netherlands). Dept. of Reactor Physics.
NEUTRON EMBRITTLEMENT OF THE REACTOR VESSEL IN BORSSELE AS DETERMINED FROM CHARPY SPECIMENS
W. J. Oosterkamp and L. B. Dufour 1983 12 p refs Sponsored by Energy Company, Zeeland Province, Netherlands
(S/T-Rept-Vol-1-No-4; B8464517; ISBN-90-353-0008-4; ISSN-0167-8590) Avail: NTIS HC A02/MF A01

Two sets of Charpy specimens were retrieved from a nuclear power reactor after two and four cycles of operation, respectively. The neutron fluxes at the sample positions and at the vessel wall were calculated with a point kernel method and S2 calculations. The calculated fluxes at the two specimen positions agree with fluences measured by threshold detectors. The reference temperature of nil ductility was determined from the Charpy tests by a tan-h fit procedure. An extrapolation to a 40 yr vessel life, based on a square root dependence of the change in the reference temperature with effective full power years was made. Under these assumptions the heat affected zone material reaches 296 K. The other materials remain below 280 K. The vessel life therefore is not limited by embrittlement. Author (ESA)

N84-30353# Loughborough Univ. of Technology (England). Dept. of Transport Technology.
FORMULATION OF STIFFNESS MATRICES FOR ELASTIC BUCKLING OF THIN-WALLED OPEN SECTION PRISMATIC COLUMNS
P. W. Sharman and M. A. Nanayakkara Feb. 1984 62 p refs
(TT-8402) Avail: NTIS HC A04/MF A01

A finite element procedure for solving large displacement problems of beams and frames, so that a structure with arbitrary geometry, complex loading and boundary conditions can be treated, was developed. The conventional stiffness formulation for small deflection is modified by the effect of axial shortening due to direct compression, lateral bending, and flexural torsion. This is incorporated in a geometric (incremental) stiffness formulation. The nonlinear load displacement path is traced by a linearized midpoint tangent predictor procedure together with coordinate transformation at every increment in load. Author (ESA)

N84-30354# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
SEISMIC RESPONSE FOR MULTICOMPONENT EARTHQUAKES
M. Ghafory-Ashtiany and M. P. Singh Apr. 1984 205 p refs
(Grant NSF CEE-82-14070)
(PB84-193747; VPI-E-84-17) Avail: NTIS HC A10/MF A01 CSCL 13M

The earthquake induced ground motions, in general, have six components: three translational and three rotational. These components are also correlated in general. The response spectrum methods were developed to obtain the structural design response for such correlated components. The forces induced in a structure depend upon the orientation of the structure with respect to the impinging seismic waves. An approach was also developed to obtain the maxmum or the worst-case response which could possibly be induced in the structure when it is oriented in a particular direction. The numerical results demonstrating the application of these approaches are presented for the proportionally as well as the nonproportionally damped structures. The results indicate that a systematic approach should be used to obtain the worst-case response to avoid an unconservative structural design. Also, the rotational components of a ground input should not be customarily disregarded as inconsequential, especially if the structure is large or tall. GRA

N84-30355# Earthquake Engineering Research Inst., Berkeley, Calif.
LOCAL BOND STRESS-SLIP RELATIONSHIPS OF DEFORMED BARS UNDER GENERALIZED EXCITATIONS: EXPERIMENTAL RESULTS AND ANALYTICAL MODEL
R. Eligehausen (Stuttgart Univ.), E. P. Popov, and V. V. Bertero Oct. 1983 190 p refs
(Grant NSF PFR-79-08984)
(PB84-192848; UCB/EERC-83/23; NSF/CEE-83036) Avail: NTIS HC A09/MF A01 CSCL 13M

Integrated experimental and analytical investigations that permit predicting analytically the local bond stress-slip relationship of deformed reinforcing bars subjected to generalized excitations, such as may occur during the response of reinforced concrete (R/C) structures to severe earthquake ground motions are described. Some 125 pull-out specimens, each simulating the confined region of a beam-column joint were tested to determine the influence of: (1) loading history; (2) confining reinforcement; (3) bar diameter and deformation pattern; (4) concrete compressive strength; (5) clear bar spacing; (6) transverse pressure; and (7) loading rate on the bond stress-slip relationships. An analytical model for the local bond stress-slip relationship of deformed bars embedded in confined concrete was developed on the assumption that the bond deterioration during generalized excitations depends on the damage experienced by the concrete, which, in turn, is a function of the total dissipated energy. GRA

N84-30356# Iowa Univ., Iowa City. Computer-Aided Engineering Instructional Lab.
TESTAMENT OF GENERAL BOUNDARY CONDITIONS AND POINT-WISE STATE VARIABLE CONSTRAINTS IN OPTIMUM

DESIGN FOR STATIC AND DYNAMIC RESPONSE
C. C. Hsieh and J. S. Arora Jan. 1984 245 p refs
(Grant NSF CEE-82-13851)
(PB84-192749; CAD-SS-84-1; NSF/CEE-84003) Avail: NTIS HC A11/MF A01 CSCL 13M

Design sensitivity analyses are presented with general boundary conditions for static response problems and for linear dynamic problems. Difficulties in treating equivalent functional constraints for the point wise state variable constraints are noted, and ideas for handling such constraints are suggested. An optimization of general response problems is provided, with the worst case design formulation and the hybrid formulation for the point wise variable constraints. It is concluded that the worse case design formulation works well as precise optimum designs are obtained and the new hybrid formulation works efficiently, converging to either optimal or near optimal solutions without any difficulty. GRA

N84-30357# California Univ., Richmond. Earthquake Engineering Research Center.
SYSTEM IDENTIFICATION OF STRUCTURES WITH JOINT ROTATION
Jerry S. Dimsdale Jul. 1983 111 p refs
(Grants NSF CEE-81-10050; NSF PFR-79-08257)
(PB84-192210; UCB/EERC-83/16; NSF/CEE-83020) Avail: NTIS HC A06/MF A01 CSCL 13M

An optical method was devised for accurately measuring joint rotation of a structure during earthquake excitation and applied to a simple six story frame in which the columns have approximately the same stiffness as the girders. Response data were collected for a variety of base motion histories. Data previously collected from a three story frame in which joint rotation information was inferred from strain measurements were also studied. A number of different mathematical models of these structures are evaluated using system identification. Each mathematical model depends on a number of parameters related to the characteristics of the structure. An iterative method is applied to calculate the values of these parameters which best reproduce the measured response of the structure. The form of the mathematical model has an effect on the degree to which the optimal parameters accurately reflect physical properties of the structure, and also influences the set of response quantities necessary for calculating an optimal set of parameters. GRA

N84-30358# Earthquake Engineering Research Inst., Berkeley, Calif.
INTERACTIVE COMPUTER ANALYSIS METHODS FOR PREDICTING THE INELASTIC CYCLIC BEHAVIOUR OF STRUCTURAL SECTIONS
S. A. Kaba and S. A. Mahin Jul. 1983 115 p refs
(Grant NSF CEE-81-07217)
(PB84-192012; UCB/EERC-83/18; NSF/CEE-83031) Avail: NTIS HC A06/MF A01 CSCL 13M

An interactive analysis program suited for micro-computers was developed to analyze structural steel, reinforced concrete, and prestressed concrete sections subjected to axial load and uniaxial bending moments. The program currently includes bilinear, cubic, and Ramberg-Osgood steel models and a concrete model that can mimic ones suggested by other researchers. The theoretical background for the program, the solution strategies used and their limitations, and the types of analyses for which the program is suited are discussed. The user can rapidly redo a particular load increment, a complete load excursion starting from specified initial conditions, or impose additional loading on the current state of the section. Input of section geometry and materials is also interactive and a user can modify parameters related to these items and reanalyze the section during the same or subsequent analysis sessions. GRA

42 GEOSCIENCES (GENERAL)

N84-30359*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT-4 SCIENCE INVESTIGATIONS SUMMARY, INCLUDING DECEMBER 1983 WORKSHOP RESULTS, VOLUME 1
John L. Barker, ed. Jul. 1984 213 p refs Proc. of LANDSAT-4 Early Results Symp., held in Greenbelt, Md., 22-24 Feb. 1983 and LANDSAT Sci. Characterization Workshop, held in Greenbelt, Md., 6 Dec. 1983 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 2 Vol.
(E84-10166; NASA-CP-2326-Vol-1; NAS 1.55:2326-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 08B

A general overview of the LANDSAT 4 system with emphasis on the Thematic Mapper (TM) is presented. A variety of topics on the design, calibration, capabilities, and image processing techniques of the TM sensor are discussed in detail. The comparison of TM data with other MSS data is also investigated. For individual titles, see N84-30360 through N84-30379.

N84-30360*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE LANDSAT-4 PROGRAM: AN OVERVIEW c43
William Webb *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 1-14 ERTS
(For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05A

LANDSAT 4 was launched on July 22, 1982. This is the first satellite to carry the high resolution, high data rate Thematic Mapper (TM). An overview of the LANDSAT 4 Program is presented in terms of the program plan, accomplishments and future events, the transition of operational responsibility to National Oceanic and Atmospheric Administration (NOAA) management and the challenges remaining to both NASA personnel and LANDSAT 4 Investigations Program participants. M.A.C.

N84-30361*# General Electric Co., Philadelphia, Pa.
LANDSAT-4 SYSTEM DESCRIPTION c43
Theodore C. Aepli *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 15-30 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 22B

The LANDSAT 4 system design and capabilities are examined. A detailed description of the satellite is presented as well as ground control facility responsibilities, image processing and communications, and examples of TM and MSS data. M.A.C.

N84-30362*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MULTISPECTRAL SCANNER (MSS) INSTRUMENT DESCRIPTION c43
John L. Barker and Gary Banks *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 31-40 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

The MSS sensor image processing and resolution capabilities as well as a general system description are presented in chart form. Emphasis is placed on absolute radiometric calibration, video and wedge level timing sequence, focal plane dimensions, sampling sequence, and a description of the mirror coordinate systems. M.A.C.

N84-30363*# Santa Barbara Research Center, Goleta, Calif.
THEMATIC MAPPER (TM) INSTRUMENT DESCRIPTION c43
Jack Engel *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1

Jul. 1984 p 41-61 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

A detailed description of the thematic mapper (TM) instrument is presented in chart form. A comparison is made between TM and MSS capabilities. Applications for TM data are also included. M.A.C.

N84-30364*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN OVERVIEW OF LANDSAT-4 AND THE THEMATIC MAPPER c43
James R. Irons *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 62-64 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

The LANDSAT 4 satellite and its orbit, the Thematic Mapper (TM) sensor design, and the ground processing of TM data are discussed. The design of LANDSAT 4 incorporates several technological advancements which include the TM. The TM offers refinements over the familiar Multispectral Scanners (MSS's) aboard all of the LANDSAT satellites in terms of spatial, spectral, and radiometric resolutions. The TM data undergo radiometric and geometric corrections on the ground to provide investigators with pictorial and digital image data products. M.A.C.

N84-30365*# Santa Barbara Research Center, Goleta, Calif.
THEMATIC MAPPER SENSOR CHARACTERISTICS c43
Jack Engel *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 65-89 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

The characteristics of the thematic mapper (TM) sensor onboard the LANDSAT 4 satellite are discussed. Topics include instantaneous field of view size, rise time, delay time, square wave response, bright target recovery, altitude effects, band to band registration, and scan profile linearity. M.A.C.

N84-30366*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RADIOMETRIC CALIBRATION AND PROCESSING PROCEDURE FOR REFLECTIVE BANDS ON LANDSAT-4 PROTOFLIGHT THEMATIC MAPPER c43
John L. Barker, R. B. Abrams (Computer Sciences Corp., Silver Spring, Md.), D. L. Ball (Computer Sciences Corp., Silver Spring, Md.), and K. C. Leung (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 90-91 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

Descriptive and procedural background material for understanding results from radiometric calibration of the reflective bands and digital image products of the thermal mapper (TM) are discussed. The radiometric subsystems of the TM are described, with emphasis on the internal calibrator pulse shapes and timing cycle. M.A.C.

N84-30367*# General Electric Co., Philadelphia, Pa.
AN OVERVIEW OF THE THEMATIC MAPPER GEOMETRIC CORRECTION SYSTEM c43
Eric P. Beyer *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 92-100 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

The processing concepts which form the basis of the Thematic Mapper (TM) Geometric Correction System are examined. The principle flight and ground segment subsystems are discussed. Correction data is generated and compared to TM image data. Geometric accuracy is defined and investigated along with a general system overview. M.A.C.

N84-30368*# General Electric Co., Lanham, Md. Space Div.
THEMATIC MAPPER IMAGE PROCESSING SYSTEM (TIPS) PROCESSING STATUS c43
Joan Brooks *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 101-105 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

Radiometric and geometric correction performance is considered. A one quantum level requirement was met in all spectral bands with an occasional band 7 exception. Initial post launch calibration was accomplished. An absolute radiometric calibration is in progress including an investigation of low impact solution to scan striping. Initial and three downstream updates as well as coordination with LANDSAT D' instrument calibration are planned. Methods and problems in measuring geometric correction performance are examined with an emphasis on temporal registration, geodetic registrtion, and the modeling error budget. Planned efforts include eliminating band 2, band 5 chips; continued performance monitoring; calibration of profile, misalignment angles, and filer parameters; studying the need for seasonal geodetic control points; and improvement of the subpixel correlation technique. A.R.H.

N84-30369*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THEMATIC MAPPER IMAGE PRODUCTION IN THE ENGINEERING CHECKOUT PHASE c43
David Fischel and John C. Lyon (Systems and Applied Sciences Corp., Hyattsville, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 106-107 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

Thematic Mapper data processing during LANDSAT 4's first year was performed on an engineering evaluation basis. Fully corrected products were created for some 282 scenes during this period using software and systems based upon the intended full production systems to become operational following the evaluation period. The engineering systems included substantial software and procedures for assessing spacecraft, instrument and ground processing algorithmic behavior. The data systems are described in terms of performance objectives, processing organization and data flow, quality assurance measurements and achievement of goals. The a priori implementation of TM radiometric and geometric corrections is described. Changes to processing suggested by or implemented on the basis of on-orbit data analysis are discussed. Spacecraft, instrument and algorithmic performance are evaluated. Author

N84-30370*# International Business Machines Corp., Palo Alto, Calif. Scientific Center.
LANDSAT-4 RADIOMETRIC AND GEOMETRIC CORRECTION AND IMAGE ENHANCEMENT RESULTS c43
Ralph Bernstein and Jeffrey B. Lotspiech *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 108-115 ref ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

Techniques were developed or improved to calibrate, enhance, and geometrically correct LANDSAT-4 satellite data. Statistical techniques to correct data radiometry were evaluated and were found to minimize striping and banding. Conventional techniques cause striping even with perfect calibration parameters. Intensity enhancement techniques were improved to display image data with large variation in intensity or brightness. Data were geometrically corrected to conform to a 1:100,000 map reference and image products produced with the map overlay. It is shown that these products can serve as accurate map products. A personal computer was experimentally used for digital image processing. Author

N84-30371*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TM DIGITAL IMAGE PRODUCTS FOR APPLICATIONS c43

John L. Barker, Fred J. Gunther (Computer Sciences Corp., Silver Spring, Md.), Rochelle B. Abrams (Computer Sciences Corp., Silver Spring, Md.), and Dave L. Ball (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 116-126 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

LANDSAT-4 Thematic Mapper (TM) digital image products recorded onto computer compatible tapes (CCTs), which were available for internal research purposes prior to August, 1983, are reviewed. The SCROUNGE image processing system at Goddard Space Flight Centr generated in tape formats: (1) raw band-sequential data (CCT-BT), generally used for internal transportation of digital data from one ground processing system to another; (2) calibrated data (CCT-AT), useful for reseachers doing radiometric characterization; and (3) geometrically resampled data (CCT-PT), the final product. The formats represent different steps in the process of producing fully-corrected TM data. The CCT-BT images are re-sequenced from telemetry format to image format, but are uncorrected radiometrically and geometrically. The CCT-AT images had data from two faulty data channels replaced and all data radiometrically calibrated. The CCT-PT images were resampled by cubic convolution procedures to provide a geometrically corrected image using satellite ephemeris and altitude data and scan-mirror correction data. The final product, the CCT-PT, is the one to which all of the radiometric and geometric corrections were applied. A.R.H.

N84-30372*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPECTRAL CHARACTERIZATION OF THE LANDSAT THEMATIC MAPPER SENSORS c43
Brian L. Markham and John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 127-129 Previously announced as N84-15634 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

Data collected on the spectral characteristics of the LANDSAT-4 and LANDSAT-4 backup thematic mapper instruments, the protoflight (TM/PF) and flight (TM/F) models, respectively, are presented and analyzed. Tests were conducted on the instruments and their components to determine compliance with two sets of spectral specifications: band-by-band spectral coverage and channel-by-channel within-band spctral matching. Spectral coverage specifications were placed on: (1) band edges - points at 50% of peak response, (2) band edge slopes - steepness of rise and fall-off of response, (3) spectral flatness - evenness of response between edges, and (4) spurious system response - ratio of out-of-band response to in-band response. Compliance with the spectral coverage specifications was determined by analysis of spectral measurements on the individual components contributing to the overall spectral response: filters, detectors, and optical surfaces. M.G.

N84-30373*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRE-LAUNCH ABSOLUTE RADIOMETRIC CALIBRATION OF LANDSAT-4 PROTOFLIGHT THEMATIC MAPPER c35
John L. Barker, D. L. Ball (Computer Sciences Corp., Silver Spring, Md.), K. C. Leung (Computer Sciences Corp., Silver Spring, Md.), and J. A. Walker (Santa Barbara Research Center, Goleta, Calif.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 130-139 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

From both scientific and applications perspectives, the usefulness of TM digital imagery is significantly determined by its radiometric characteristics. This includes both the accuracy to which the dynamic range is known and its radiometric reproducibility or precision. Results from several pre-launch tests with a 122-cm Integrating Sphere (IS) used as part of the absolute radiometric calibration experiments for the protoflight TM sensor carried on the LANDSAT-4 satellite are summarized and analyzed. Topics covered include TM radiometric calibration and sensitivity; the TM internal calibrator; and the dynamic range after calibration. A.R.H.

N84-30374*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RELATIVE RADIOMETRIC CALIBRATION OF LANDSAT TM REFLECTIVE BANDS c35
John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 140-180 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

The characterization of the relative radiometric calibration of the protoflight Thematic Mapper sensor (TM/PF) is considered with focus on the variability and uncertainty of TM relative radiometry, including total variability as well as its systematic and random components. Emphasis is placed on identifying the magnitude and types of systematic errors, since these have the potential for being reduced during ground processing. Estimates of innate random variability, such as the standard deviation of a signal or its signal to noise ratio, are also important. The processing effects of radiometry are explored. Recommendations are given for engineering characterization, flight segment operations and ground processing. A.R.H.

N84-30375*# Rochester Inst. of Tech., N. Y.
EVALUATION OF THE RADIOMETRIC INTEGRITY OF LANDSAT-4 THEMATIC MAPPER BAND 6 DATA c35
John R. Schott *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 181-185 refs ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

An approach for experimentally evaluating the radiometric calibration of the LANDSAT-4 band 6 data is described which draws on a method used to radiometrically calibrate the HCMR data which involved underflying the satellite with an infrared line scanner. By extending this technology to higher altitudes experimental radiance data suitable for radiometric calibration of the TM band 6 sensor can be generated. Repetition of this experiment can permit evaluation of long term drift in the sensor and provide a data base for evaluating atmospheric propagation models for radiation transfer. To date, efforts were concentrated on modifying the infrared line scanner to match the spectral response of the TM band 6 sensor. In addition, the LOWTRAN code corresponding to a satellite overpass of September 1982 was run to yield a plot of transmission and path radiance as a function of altitude. A.R.H.

N84-30376*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THERMAL BAND CHARACTERIZATION OF LANDSAT-4 THEMATIC MAPPER c43
Jack C. Lansing (Santa Barbara Research Center, Goleta, Calif.) and John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 186-188 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

A quick look monitor in the spacecraft control center was used to measure the TM Band 6 shutter background and the 34.7 C internal blackbody signal on over 50 dates. Comparison of relative internal gains between the four channels to prelaunch values showed changes over 9 months of up to 5%, while 512 x 512 subsections of the original 10 daytime scenes showed scene counts that ranged from 135 down to 62. A night scene of the Buffalo area was used to determine channel gain relative to the mean and to discern a systematic along scan pattern in a difference between forward and reverse scan counts of up to 0.5. A corrected digital image was produced and individual gains and offsets were calculated for the four channels. At satellite radiance was determine and noise equivalent temperature difference was calculated. The calibration data and the Buffalo scene, with the corrections and estimates of the atmospheric transmission and radiance, were used to make a temperature estimate for an area of Lake Erie of 21 C to 27 C. Local records of the temperature showed 21 C. A.R.H.

N84-30377*# Energy, Mines and Resources Canada, Ottawa (Ontario).
A PRELIMINARY ASSESSMENT OF LANDSAT-4 THEMATIC MAPPER DATA Abstract Only **c82**
D. G. Goodenough, E. A. Fleming, and K. Dickinson *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 189 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

The results of a preliminary assessment of both raw and NASA processed Thematic Mapper (TM) data are discussed. Geometric correction of NASA processed TM data was carried out. Correction was possible to within 3 pixels in the along track direction and 2 pixels in the across track direction. A preliminary evaluation of TM imagery provided by the NASA LANDSAT Assessmemt System for geometric accuracy and map information content was performed on samples of imagery. The initial indications were that bands 3, 5 and 7 contain the most useful cartographic information. The resolution of rural and urban detail as well as the fit to plotted map detail was found to be improved over LANDSAT MSS, and such images may provide adequate revision information for 1:250,000 maps in areas where it is not currently profitable to use LANDSAT MSS. The relative gains and offsets for each detector in each band of raw data were calculated in a study of the radiometric correction of TM data. This was done for different subscenes as well as a full scene and the variation of the results with direction of scan and position of subscene were studied.
Author

N84-30378*# Canada Centre for Remote Sensing, Ottawa (Ontario).
REVISED RADIOMETRIC CALIBRATION TECHNIQUE FOR LANDSAT-4 THEMATIC MAPPER DATA BY THE CANADA CENTRE FOR REMOTE SENSING **c82**
J. Murphy, T. Butlin, P. Duff, and A. Fitzgerald *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 190-198 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

A technique for the radiometric correction of LANDSAT-4 Thematic Mapper data was proposed by the Canada Center for Remote Sensing. Subsequent detailed observations of raw image data, raw radiometric calibration data and background measurements extracted from the raw data stream on High Density Tape highlighted major shortcomings in the proposed method which if left uncorrected, can cause severe radiometric striping in the output product. Results are presented which correlate measurements of the DC background with variations in both image data background and calibration samples. The effect on both raw data and on data corrected using the earlier proposed technique is explained, and the correction required for these factors as a function of individual scan line number for each detector is described. It is shown how the revised technique can be incorporated into an operational environment.
A.R.H.

N84-30379*# European Space Agency, Frascati (Italy).
A PRELIMINARY ANALYSIS OF LANDSAT-4 THEMATIC MAPPER RADIOMETRIC PERFORMANCE **c35**
C. Justice, L. Fusco, and W. Mehl (Joint Research Centre of the European Communities) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 199 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

Analysis was performed to characterize the radiometry of three Thematic Mapper (TM) digital products of a scene of Arkansas. The three digital products examined were the NASA raw (BT) product, the radiometrically corrected (AT) product and the radiometrically and geometrically corrected (PT) product. The frequency distribution of the digital data; the statistical correlation between the bands; and the variability between the detectors within a band were examined on a series of image subsets from the full scene. The results are presented from one 1024 x 1024 pixel subset of Realfoot Lake, Tennessee which displayed a representative range of ground conditions and cover types occurring within the full frame image. Bands 1, 2 and 5 of the sample area are presented. The subsets were extracted from the three digital data products to cover the same geographic area. This analysis provides the first step towards a full appraisal of the TM radiometry being performed as part of the ESA/CEC contribution to the NASA/LIDQA program.
Author

N84-30380*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT-4 SCIENCE INVESTIGATIONS SUMMARY, INCLUDING DECEMBER 1983 WORKSHOP RESULTS, VOLUME 2
John L. Barker, ed. Jul. 1984 188 p refs Proc. of the LANDSAT-4 Early Results Symp., held in Greenbelt, Md., 22-24 Feb. 1983 and LANDSAT Sci. Characterization Workshop, held in Greenbelt, Md., 6 Dec. 1983 ERTS 2 Vol.
(E84-10167; NASA-CP-2326-Vol-2; NAS 1.55:2326-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 08B

A series of brief summaries of the results of individual investigations of LANDSAT 4 image data characteristics are presented. Topics are divided into MSS and TM investigations, and applications of the imaging techniques. Radiometric and geometric accuracy are emphasized. For individual titles, see N84-30381 through N84-30432.

N84-30381*# Purdue Univ., Lafayette, Ind.
LANDSAT-4 MSS AND TM SPECTRAL CLASS COMPARISON AND COHERENT NOISE ANALYSIS **c43**
P. E. Anuta, L. Bartolucci, E. Dean, F. Lozano, E. Malaret, C. D. McGillem, J. Valdes, and C. Valenzuela *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 1-6 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

A detailed spectral analysis is conducted of thematic mapper and MSS data for an area near Des Moines, Iowa. Data are utilized from 7 blocks distributed throughout the area which included agricultural, forest, suburan, urban, and water scene types. The blocks are processed using a clustering algorithm to produce up to 18 cluster groupings for each block. Each cluster class is then identified with a ground-cover class using aerial photography and maps of the area. The clusters from each of the 7 blocks are inspected with regard to separability, mean, and variances. The separability measure used in the transformed divergence function or processor measures the statistical distance between classes based on class means and covariance matrices. The measure has a maximum value of 2,000 and the minimum of 0. Spectrally, very close classes will typically have values as low as 50 to 500.
M.A.C.

N84-30382*# European Space Agency, Frascati (Italy). Earthnet Programme Office.
TM FAILED DETECTORS DATA REPLACEMENT **c35**
L. Fusco and D. Trevese *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 7-14 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

Some of the LANDSAT 4 Thematic Mapper detectors (band 2 detector 4 and band 5 detector 3) have inadequate performances. The operational system correction processing will disregard the data sensed by the failed detectors and replace them by data coming from the neighbor detectors of the same spectra band. The analysis performed by ESA Earthnet and attempts to suggest an operational failed detector replacement algorithm are described.
M.A.C.

N84-30383*# Arizona Univ., Tucson. Remote Sensing Center.
IN-FLIGHT ABSOLUTE RADIOMETRIC CALIBRATION OF THE THEMATIC MAPPER **c35**
K. R. Castle, R. G. Holm, C. J. Kastner, J. M. Palmer, P. N.

Slater, M. Dinguirard (Centre d'Etudes et de Recherche de Toulouse, France), C. E. Ezra (Dept. of Agriculture, Beltsville, Md.), D. Jackson (Dept. of Agriculture, Beltsville, Md.), and R. K. Savage (Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 15-19 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

The Thematic Mapper (TM) multispectral scanner system was placed into Earth orbit on July 16, 1982, as part of NASA's LANDSAT 4 payload. To determine temporal changes of the absolute radiometric calibration of the entire system in flight, spectroradiometric measurements of the ground and the atmosphere are made simultaneously with TM image acquisitions over the White Sands, New Mexico area. By entering the measured values into an atmospheric radiative transfer program, the radiance levels at the entrance pupil of the TM in four of the TM spectral bands are determined. These levels are compared to the output digital counts from the detectors that sampled the radiometrically measured ground area, thus providing an absolute radiometric calibration of the entire TM system utilizing those detectors. By reference to an adjacent, larger uniform area, the calibration is extended to all 16 detectors in each of the three bands. M.A.C.

N84-30384*# National Oceanic and Atmospheric Administration, Washington, D. C. National Environmental Satellite, Data, and Information Service.
LANDSAT-4 THEMATIC MAPPER CALIBRATION AND ATMOSPHERIC CORRECTION Abstract Only c35
Warren A. Hovis *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 20 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

In order to utilize the quantitative accuracy built into the Thematic Mapper effectively, more attention must be paid to calibration before launch, changes of calibration before launch, changes of calibration with time in orbit, and atmospheric interference with the measurements, especially in the 450 to 520 nanometer band. Recent experience with the Coastal Zone Color Scanner (CZCS) program has led to procedures wherein Rayleigh correction factors can be generated utilizing simultaneous surface truth data that empirically give correct upwelled surface radiances. Instruments, such as the CZCS, have shown that calibration changes first, and to the largest degree, at the shorter wave lengths, with lesser changes as wave length increases. These techniques are utilized to calculate a Rayleigh correction factor that, together with geometric terms, will give an accurate correction for this portion of the atmospheric contribution to the signal. M.A.C.

N84-30385*# Laboratoire de Meteorologie Dynamique, Paris (France).
CALIBRATION OF TM DATA FROM GROUND-BASED MEASUREMENTS c82
S. I. Rasool and P. Y. Deschamps (CNES, Toulouse) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 21-22 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Methods of calibrating Thematic Mapper (TM) data by the use of ground based measurements are presented. Applications of the TM remote sensing data are discussed in addition to the ground truth measurement equipment and techniques. M.A.C.

N84-30386*# Environmental Research Inst. of Michigan, Ann Arbor.
SCAN-ANGLE AND DETECTOR EFFECTS IN THEMATIC MAPPER RADIOMETRY c43
Michael D. Metzler and William A. Malila *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 23-27 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

The performance of the Thematic Mapper (TM) as manifested by the quality of its image data is examined in order to suggest possible improvements for data production and assess the effects of data quality on its utility for land resources applications. The major emphasis is on the radiometric characteristics of TM data, with some attention to spatial and spectral characteristics. M.A.C.

N84-30387*# Environmental Research Inst. of Michigan, Ann Arbor.
THEMATIC MAPPER SPECTRAL DIMENSIONALITY AND DATA STRUCTURE c43
E. P. Crist and R. C. Cicone *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 28-31 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

Thematic Mapper data, simulated from field and laboratory spectrometer measurements of a variety of agricultural crops and a wide range of soils, are analyzed to determine their dispersion in the six space defined by the reflective TM bands (i.e., excluding the thermal band). While similar analyses of MSS data from agricultural scenes show that the vast majority of the MSS data occupy a single plane, the simulated TM data primarily occupy three dimensions, defining two intersecting planes and a zone of transition between the two. Viewing the plane of Vegetation head on provides a projection comparable to the single plane of MSS data. The Plane of Soils and transition zone represent new information made available largely as a result of the longer infrared bands included in the Thematic Mapper. A transformation, named the Thematic Mapper Tasseled Cap, is presented which rotates the TM data such that the described data structure is most readily accessible to view. M.A.C.

N84-30388*# Arizona Univ., Tucson.
MTF ANALYSIS OF LANDSAT-4 THEMATIC MAPPER Abstract Only c43
Robert Schowengerdt *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 32 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

A research program to measure the LANDSAT 4 Thematic Mapper (TM) modulation transfer function (MTF) is described. Measurement of a satellite sensor's MTF requires the use of a calibrated ground target, i.e., the spatial radiance distribution of the target must be known to a resolution at least four to five times greater than that of the system under test. A small reflective mirror or a dark light linear pattern such as line or edge, and relatively high resolution underflight imagery are used to calibrate the target. A technique that utilizes an analytical model for the scene spatial frequency power spectrum will be investigated as an alternative to calibration of the scene. The test sites and analysis techniques are also described. M.A.C.

N84-30389*# Geological Survey, Flagstaff, Ariz.
INTRABAND RADIOMETRIC PERFORMANCE OF THE LANDSAT-4 THEMATIC MAPPER c43
Hugh H. Kieffer, Eric M. Eliason, and Pat S. Chavez, Jr. *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 33-34 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

Radiometric characteristics of the LANDSAT 4 Thematic Mapper (TM) that can be established without absolute calibration of spectral data are examined. The analysis is based on radiometrically raw (B type) data of three daytime and two nighttime scenes. A set of 512 lines are examined on an individual detector basis. Subscenes selected for uniform-radiance are used to characterize subtle radiometric differences and noise problems. Virtually all nonideal performance is incorporated into the fully processed (P type) images, but disguised by the geometric resampling technique. M.A.C.

N84-30390*# Geological Survey, Reston, Va.
ANALYSIS OF LANDSAT-4 TM DATA FOR LITHOLOGIC AND IMAGE MAPPING PURPOSE **c82**
M. H. Podwysocki, J. W. Salisbury, L. V. Bender, O. D. Jones, and D. L. Mimms *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 35-39 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Lithologic mapping techniques using the near infrared bands of the Thematic Mapper onboard the LANDSAT 4 satellite are investigated. These methods are coupled with digital masking to test the capability of mapping geologic materials. Data are examined under medium to low Sun angle illumination conditions to determine the detection limits of materials with absorption features. Several detection anomalies are observed and explained. M.A.C.

N84-30391*# European Space Agency, Frascati (Italy).
STATUS OF THE ESA-EARTHNET LANDSAT-4 TM GROUND PROCESSING CHAIN **c43**
L. Fusco *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 40-45 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

The European program of the European Space Agency received a mandate to upgrade the two existing LANDSAT stations operating in Europe, Kiruna in Sweden and Fucino in Italy, to acquire and process TM data. The salient features of the TM systems are summarized, and the preliminary results of the acceptance tests being carried out using the TM passes acquired in Fucino are reviewed before the X band downlink anomaly of LANDSAT-4. M.A.C.

N84-30392*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN ANALYSIS LANDSAT-4 THEMATIC MAPPER GEOMETRIC PROPERTIES **c43**
R. E. Walker, A. L. Zobrist, N. A. Bryant, B. Gokhman, S. Z. Friedman, and T. L. Logan *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 46-49 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

LANDSAT Thematic Mapper P-data of Washington, D. C., Harrisburg, PA, and Salton Sea, CA are analyzed to determine magnitudes and causes of error in the geometric conformity of the data to known Earth surface geometry. Several tests of data geometry are performed. Intraband and interband correlation and registration are investigated, exclusive of map based ground truth. The magnitudes and statistical trends of pixel offsets between a single band's mirror scans (due to processing procedures) are computed, and the inter-band integrity of registration is analyzed. A line to line correlation analysis is included. M.A.C.

N84-30393*# Systems and Applied Sciences Corp., Hyattsville, Md.
THE USE OF LINEAR FEATURE DETECTION TO INVESTIGATE THEMATIC MAPPER DATA PERFORMANCE AND PROCESSING **c43**
Charlotte M. Gurney *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 50-52 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

Geometric and radiometric characteristics of Thematic Mapper data are investigated through analysis of linear features in the data. A linear feature is defined as two close, parallel and opposite edges. Examples in remotely sensed data are such features as rivers and roads. The geometric and radiometric precision TM data is sufficient to allow accurate measurement of linear feature widths. Results also confirm a 28.5m ground IFOV as specified prior to launch. The increase dimensionality of the TM data as compared with MSS data allows the possibility of independent verification of results by using data from several bands. M.A.C.

N84-30394*# Purdue Univ., Lafayette, Ind.
SPATIAL RESOLUTION ESTIMATION OF LANDSAT-4 TM DATA Abstract Only **c82**
Clare D. McGillem, Paul E. Anuta, Erick Malaret, and Kai-Bor Yu (Virginia Polytechnic Inst., Blacksburg) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 53 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Experiments to determine overall radiometric resolution are discussed. Scene structures, such as roads and field edges, are used with numerical estimation procedures to predict resolution in LANDSAT 4 Thematic Mapper imagery. A nominal resolution of 39 meters is determined rather than the predicted 30 meter prelaunch estimates. M.A.C.

N84-30395*# Research and Data Systems, Inc., Lanham, Md.
AN ANALYSIS OF THE HIGH FREQUENCY VIBRATIONS IN EARLY THEMATIC MAPPER SCENES **c43**
John Kogut and Elaine Larduinat *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 54 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

The potential effects of high frequency vibrations on the final Thematic Mapper (TM) image are evaluated for 26 scenes. The angular displacements of the TM detectors from their nominal pointing directions as measured by the TM Angular Displacement Sensor (ADS) and the spacecraft Dry Rotor Inertial Reference Unit (DRIRU) give data on the along scan and cross scan high frequency vibrations present in each scan of a scene. These measurements are to find the maximum overlap and underlap between successive scans, and to analyze the spectrum of the high frequency vibrations acting on the detectors. The Fourier spectrum of the along scan and cross scan vibrations for each scene also evaluated. The spectra of the scenes examined indicate that the high frequency vibrations arise primarily from the motion of the TM and MSS mirrors, and that their amplitudes are well within expected ranges. M.A.C.

N84-30396*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ASSESSMENT OF THEMATIC MAPPER BAND-TO-BAND REGISTRATION BY THE BLOCK CORRELATION METHOD Abstract Only **c43**
Don H. Card, Robert C. Wrigley, Frederick C. Mertz (Technicolor Government Services, Inc., Moffett Field, Calif.), and Jeff R. Hall (Technicolor Government Services, Inc., Moffett Field, Calif.) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 55-58 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

The design of the Thematic Mapper (TM) multispectral radiometer makes it susceptible to band-to-band misregistration. To estimate band-to-band misregistration a block correlation method is employed. This method is chosen over other possible techniques (band differencing and flickering) because quantitative results are produced. The method correlates rectangular blocks of pixels from one band against blocks centered on identical pixels from a second band. The block pairs are shifted in pixel increments both vertically and horizontally with respect to each other and the correlation coefficient for each shift position is computed. The displacement corresponding to the maximum correlation is taken as the best estimate of registration error for each block pair. Subpixel shifts are estimated by a bi-quadratic interpolation of the correlation values surrounding the maximum correlation. To obtain statistical summaries for each band combination post processing of the block correlation results performed. The method results in estimates of registration error that are consistent with expectations. M.A.C.

N84-30397*# Geological Survey, Flagstaff, Ariz.
TESTS OF LOW-FREQUENCY GEOMETRIC DISTORTIONS IN LANDSAT-4 IMAGES Abstract Only c82
R. M. Batson and W. T. Borgeson *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 59 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

The geometric fidelity of the GSFC filmwriter used for Thematic Mapper (TM) images was assessed by measurement with accuracy better than three micrometers of a test grid. A set of 55 control points with known UTM coordinates was measured on a digital display of part of band 5 of the TM image of the Washington, D.C. area and fitted to the control points. The tests indicate that the geometric fidelity of TM images is likely to be higher than the ability of film recorders to reproduce the images. Author

N84-30398*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
INVESTIGATION OF TM BAND-TO-BAND REGISTRATION USING THE JSC REGISTRATION PROCESSOR c82
S. S. Yao and M. L. Amis *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 60-61 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

The JSC registration processor performs scene-to-scene (or band-to-band) correlation based on edge images. The edge images are derived from a percentage of the edge pixels calculated from the raw scene data, excluding clouds and other extraneous data in the scene. Correlations are performed on patches (blocks) of the edge images, and the correlation peak location in each patch is estimated iteratively to fractional pixel location accuracy. Peak offset locations from all patches over the scene are then considered together, and a variety of tests are made to weed out outliers and other inconsistencies before a distortion model is assumed. Thus, the correlation peak offset locations in each patch indicate quantitatively how well the two TM bands register to each other over that patch of scene data. The average of these offsets indicate the overall accuracies of the band-to-band registration. The registration processor was also used to register one acquisition to another acquisition of multitemporal TM data acquired over the same ground track. Band 4 images from both acquisitions were correlated and an rms error of a fraction of a pixel was routinely obtained. A.R.H.

N84-30399*# EROS Data Center, Sioux Falls, S. Dak.
GEODETIC ACCURACY OF LANDSAT-4 MULTISPECTRAL SCANNER AND THEMATIC MAPPER DATA Abstract Only c82
J. M. Thormodsgard and D. J. Devries *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 62-63 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

The geodetic accuracy of an MSS or TM scene is assessed using a minicomputer and appropriate software, a digitizer, and an image display device. The calculated image location of a selected feature is compared with the actual image location obtained though visual inspection of the image on the display. Measurements of 15 to 20 features evenly distributed throughout the image provide an estimate of the geodetic accuracy of the scene. Tests of two system-corrected MSS scenes measured geodetic registration root-mean-square (RMS) errors of approximately 3,200 m or 57 pixels. Tests of two TM system-corrected scenes measured RMS errors of approximately 1,250 and 1,000 m, or 44 and 35 pixels, respectively. All errors were primarily translational, implying good internal scene registration of both MSS and TM data. The one MSS GCP-corrected scene which was evaluated had an RMS error of approximately 325 m or 6 pixels. A.R.H.

N84-30400*# State Univ. of New York, Syracuse.
THE EFFECT OF POINT-SPREAD FUNCTION INTERACTION WITH RADIANCE FROM HETEROGENEOUS SCENES ON MULTITEMPORAL SIGNATURE ANALYSIS c43
M. J. Duggin and L. B. Schoch *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 64-68 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

The point-spread function is an important factor in determining the nature of feature types on the basis of multispectral recorded radiance, particularly from heterogeneous scenes and particularly from scenes which are imaged repetitively, in order to provide thematic characterization by means of multitemporal signature. To demonstrate the effect of the interaction of scene heterogeneity with the point spread function (PSF)1, a template was constructed from the line spread function (LSF) data for the thematic mapper photoflight model. The template was in 0.25 (nominal) pixel increments in the scan line direction across three scenes of different heterogeneity. The sensor output was calculated by considering the calculated scene radiance from each scene element occurring between the contours of the PSF template, plotted on a movable mylar sheet while it was located at a given position. Author

N84-30401*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RADIOMETRIC ACCURACY ASSESSMENT OF LANDSAT-4 MULTISPECTRAL SCANNER (MSS) DATA c43
William L. Alford and Marc L. Imhoff *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 69-72 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

The LANDSAT-4 mission has unique characteristics relative to previous LANDSAT missions. The spacecraft is new; the orbit is lower with a more frequent repeat cycle; and the ground processing facility consists of new hardware with different algorithms being applied. How some of these changes affect the character of the radiometric data quality is explored. Banding effects; radiometric differences between LANDSAT 3 and 4; and the woodgrain pattern observed visually in the images are considered. Author

N84-30402*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPECTRAL CHARACTERIZATION OF THE LANDSAT-4 MSS SENSORS c35
Brian L. Markham and John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 73-75 Previously announced as N84-15634 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

Relative spectral response data for the LANDSAT-4 and LANDSAT-4 backup multispectral scanner subsystems (MSS), the protoflight and flight models are presented and compared to similar data for the LANDSAT 1, 2 and 3 scanners. Channel (six channels per band) outputs for soil and soybean targets were simulated and compared within each band and between scanners. The principal differences between the spectral responses of the LANDSAT-4 scanners and previous scanners are discussed. The simulated LANDSAT-4 scanner outputs were 3 to 10 percent lower in the red band and 3 to 11 percent higher in the first near-IR band than previous scanners for the soybeans targets. The LANDSAT-4 scanners were generally more uniform from channel to channel within bands than previous scanners. In the upper-band edge of the red band of the protoflight scanner, one channel was markedly different (12 nm) from the rest. For a soybeans target, this nonuniformity resulted in a within-band difference of 6.2 percent in simulated outputs between channels. A.R.H.

N84-30403*# Environmental Research Inst. of Michigan, Ann Arbor.
INVESTIGATION OF RADIOMETRIC PROPERTIES OF LANDSAT-4 MSS c35

Daniel R. Rice and William A. Malila *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 76-80 ref ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

Two full frames of radiometrically corrected (Type A) LANDSAT-4 MSS data were analyzed digitally and visually for evidence of residual calibration differences between detectors, quantization effects, and other sensor-related artifacts. Both standard statistical and Fourier analysis techniques were employed. Opportunities for coincident coverage by LANDSAT 3 and 4 were identified in the contiguous 48 states. Paired acquisitions for two scenes were obtained and analyzed to establish relatonships between signal values from common areas imaged by the MSS systems. Another pair with coverage by LANDSAT 2 and 4 was obtained and analyzed. Detector-to-detector differences, coherent noise, line length variation, and LANDSAT 4 to LANDSAT 3 calibration are discussed. A.R.H.

N84-30404*# Canada Centre for Remote Sensing, Ottawa (Ontario).
RADIOMETRIC CALIBRATION AND GEOCODED PRECISION PROCESSING OF LANDSAT-4 MULTISPECTRAL SCANNER PRODUCTS BY THE CANADA CENTRE FOR REMOTE SENSING Abstract Only **c82**
J. Murphy, D. Bennett, and F. Guertin *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 81 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Inherent in the method used by CCRS for the radiometric calibration of LANDSAT-4 MSS data is the possibility for the user to convert the corrected digital values to the absolute scene radiance of the target under observation. The generation of the constants needed for this final conversion requires both the pre-launch and post-launch radiometric calibration constants as supplied by NASA. Results of some preliminary comparative studies of the radiometric properties of the LANDSAT-4 MSS versus earlier satellites in the LANDSAT series are presented as well as early observations on the stability of the calibration data, within one scene, within one orbit, and over a period of several months. Residual striping in the corrected products is estimated. The method used to perform precision processing of the LANDSAT MSS data for generating geocoded or map compatible LANDSAT MSS products in the Unviersal Transverse Mercator projection is also reviewed. LANDSAT-4 MSS precision processed products are evaluated for geodetic accuracy, and are compared to similar products from the previous LANDSAT satellites to assess the orbit independent registration accuracy. A.R.H.

N84-30405*# National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
LANDSAT SCENE-TO-SCENE REGISTRATION ACCURACY ASSESSMENT Abstract Only **c82**
James E. Anderson *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 82 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Initial results obtained from the registration of LANDSAT-4 data to LANDSAT-2 MSS data are documented and compared with results obtained from a LANDSAT-2 MSS-to-LANDSAT-2 scene-to-scene registration (using the same LANDSAT-2 MSS data as the base data set in both procedures). RMS errors calculated on the control points used in the establishment of scene-to-scene mapping equations are compared to error computed from independently chosen verification points. Models developed to estimate actual scene-to-scene registration accuracy based on the use of electrostatic plots are also presented. Analysis of results indicates a statistically significant difference in the RMS errors for the element contribution. Scan line errors were not significantly different. It appears that a modification to the LANDSAT-4 MSS scan mirror coefficients is required to correct the situation. A.R.H.

N84-30406*# Georgia Univ., Athens. Dept. of Geography.
GEOMETRIC ACCURACY OF LANDSAT-4 MSS IMAGE DATA **c82**
R. Welch and E. Lynn Usery *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 83-84 Previously announced as N83-27322 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Analyses of the LANDSAT-4 MSS image data of North Georgia provided by the EDC in CTT-p formats reveal that errors of approximately + or - 30 m in the raw data can be reduced to about + or - 55 m based on rectification procedures involving the use of 20 to 30 well-distributed GCPs and 2nd or 3rd degree polynomial equations. Higher order polynomials do not appear to improve the rectification accuracy. A subscene area of 256 by 256 pixels was rectified with a 1st degree polynomial to yield an RMSE sub xy value of + or - 40 m, indicating that USGS 1:24,000 scale quadrangle-sized areas of LANDSAT-4 data can be fitted to a map base with relatively few control points and simple equations. The errors in the rectification process are caused by the spatial resolution of the MSS data, by errors in the maps and GCP digitizing process, and by displacements caused by terrain relief. Overall, due to the improved pointing and attitude control of the spacecraft, the geometric quality of the LANDSAT-4 MSS data appears much improved over that of LANDSAT-1, -2 AND -3. A.R.H.

N84-30407*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEOMETRIC ACCURACY ASSESSMENT OF LANDSAT-4 MULTISPECTRAL SCANNER (MSS) **c82**
Marc L. Imhoff and William L. Alford *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 85-86 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Standard LANDSAT-4 MSS digital image data were analyzed for geometric accuracy using two P-format (UTM projection) images of the Washington, D.C. area, scene day 109 (ID number 4010-915140) and scene day 125 (ID number 4012515144). Both scenes were tested for geodetic registration accuracy (scene-to-map), temporal registration accuracy (scene-to-scene), and band-to-band registration accuracy (within a scene). The combined RMS error for geodetic registration accuracy was 0.43 pixel (25.51 meters), well within specifications. The comparison between the 2 scenes was made on a band-by-band basis. The 90 percent error figure for temporal registration was 0.68 (57x57) pixel (38.8 meters). Although this figure is larger than the specification, it can be considered excellent with respect to user application. The best case registration errors between bands 1 and 2, and 3 and 4 were 14.2m and 13.7m, respectively, both within specifications. The worst case registration error was 38.0 m between bands 2 and 3. A.R.H.

N84-30408*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
IMPACT OF LANDSAT MSS SENSOR DIFFERENCES ON CHANGE DETECTION ANALYSIS **c43**
William C. Likens and Robert C. Wrigley *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 87-90 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

Change detection techniques were used to pinpoint differences in the multispectral band scanners on LANDSAT 2, 3, and 4 satellites. The method of analysis was to co-register 512 by 512 pixel subwindows for all data pairs followed by scattergram generation and analysis. In all cases, the LANDSAT-4 data were used as the base to which other images were registered. There appear to be no major problems preventing use of LANDSAT-4 MSS with previous MSS sensors for charge detection, provided the interference noise can be removed or minimized. This noise may result in detection of spurious changes, as well as affect other uses of the data, including image classification. Analysis of dark (water and forests), rather than light features will be most impacted because the noise will form a higher percentage of the total response at low DN values. Any data normalizations for change detection should be based upon the data, rather than solely upon calibration information. While the observed relative radiometric transfer function between LANDSAT 3 and 4 was approximately as predicted, there were still significant deviations. Normalizing based upon data content also can have the advantage of allowing simultaneous normalization of the atmosphere as well as the radiometry. A.R.H.

N84-30409*# General Electric Co., Lanham, Md. Space Div.
LANDSAT-4 MSS GEOMETRIC CORRECTION: METHODS AND RESULTS **c82**
J. Brooks, E. Kimmer, and J. Su *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 91-92 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

An automated image registration system such as that developed for LANDSAT-4 can produce all of the information needed to verify and calibrate the software and to evaluate system performance. The on-line MSS archive generation process which upgrades systematic correction data to geodetic correction data is described as well as the control point library build subsystem which generates control point chips and support data for on-line upgrade of correction data. The system performance was evaluated for both temporal and geodetic registration. For temporal registration, 90% errors were computed to be .36 IFOV (instantaneous field of view) = 82.7 meters) cross track, and .29 IFOV along track. Also, for actual production runs monitored, the 90% errors were .29 IFOV cross track and .25 IFOV along track. The system specification is .3 IFOV, 90% of the time, both cross and along track. For geodetic registration performance, the model bias was measured by designating control points in the geodetically corrected imagery. A.R.H.

N84-30410*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IMPACT OF THEMATIC MAPPER SENSOR CHARACTERISTICS ON CLASSIFICATION ACCURACY **c35**
Darrel L. Williams, James R. Irons, Brian L. Markham, Ross F. Nelson, David L. Toll, Richard S. Latty (Maryland Univ., College Park), and Mark L. Stauffer (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 93-97 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

A three factor (spectral, spatial, and radiometric resolution), two level (TM and MSS) analysis of variance (ANOVA) approach allowed evaluation of the effects of each factor individually and in all possible combinations. Digital classification accuracy was used as the figure of merit. Nine study sites in Washington, D.C. each of approximately 256 x 256 TM pixels, were randomly selected from the full scene for analysis. These results strongly suggest that the quantization level improvements and the addition of new spectral bands in the visible and middle IR regions (both afforded by the TM sensor design) can result in improved capabilities to accurately delineate land cover categories using a per point Gaussian maximum likelihood classifier. On the other hand, results indicate that the increase in spatial resolution to 30m does not significantly enhance classification accuracy. The spatial result points to an inherent limitation of a per point classifier and to the need to improve data analysis techniques to handle high spatial resolution data. A.R.H.

N84-30411*# California Univ., Berkeley. Remote Sensing Research Program.
CHARACTERIZATION OF LANDSAT-4 TM AND MSS IMAGE QUALITY FOR INTERPRETATION OF AGRICULTURAL AND FOREST RESOURCES Abstract Only **c43**
S. D. Degloria and R. N. Colwell *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 98-102 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

Systematic analysis of both image and numeric data shows that the overall spectral, spatial, and radiometric quality of the TM data are excellent. Spectral variations in fallow fields are due to the vaiability in soil moisture and surface roughness resulting from the various stages of field preparation for small grains production. Spectrally, the addition of the first TM short wave infrared band (Band 5) significantly enhanced ability to discriminate different crop types. Bands 1, 5, and 6 contain saturated pixels due to high albedo effects, low moisture conditions, and high radiant temperatures of granite and dry, bare soil on south facing slopes, respectively. Spatially, the two fold decrease in interpixel distance and four fold decrease in area per pixel between the TM and MSS allow for improved discrimination of small fields, boundary conditions, road and stream networks in rough terrain, and small forest clearings resulting from various forest management practices. A.R.H.

N84-30412*# Earth Satellite Corp., Chevy Chase, Md.
EVALUATION OF LANDSAT-4 THEMATIC MAPPER DATA AS APPLIED TO GEOLOGIC EXPLORATION: SUMMARY OF RESULTS **c43**
Jon D. Dykstra, Charles A. Sheffield, and John R. Everett *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 103-108 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01

As with any tool applied to geologic exploration, maximum value results from the innovative integration of optimally processed LANDSAT-4 data with existing pertinent information and perceptive geologic thinking. The synoptic view of the satellite images and the relatively high resolution of the data permits recognization of regional tectonic patterns and their detailed mapping. The refined spatial and spectral characteristics and digital nature surface alterations associated with hydrothermal activity and microseepage of hydrocarbons. In general, as vegetation and soil cover increase, the value of spectral components of TM data decreases with respect to the value of the spatial component of the data. This observation reinforces the experience from working with MSS data that digital processing must be optimized both for the area and for the application. A.R.H.

N84-30413*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PRELIMINARY GEOLOGIC/SPECTRAL ANALYSIS OF LANDSAT-4 THEMATIC MAPPER DATA, WIND RIVER/BIGHORN BASIN AREA, WYOMING Abstract Only **c46**
Harold R. Lang, James E. Conel, and Earnest D. Paylor *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 109-110 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08G

A LIDQA evaluation for geologic applications of a LANDSAT TM scene covering the Wind River/Bighorn Basin area, Wyoming, is examined. This involves a quantitative assessment of data quality including spatial and spectral characteristics. Analysis is concentrated on the 6 visible, near infrared, and short wavelength infrared bands. Preliminary analysis demonstrates that: (1) principal component images derived from the correlation matrix provide the most useful geologic information. To extract surface spectral reflectance, the TM radiance data must be calibrated. Scatterplots demonstrate that TM data can be calibrated and sensor response is essentially linear. Low instrumental offset and gain settings result in spectral data that do not utilize the full dynamic range of the TM system. M.A.C.

N84-30414*# National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
AN INITIAL ANALYSIS OF LANDSAT-4 THEMATIC MAPPER DATA FOR THE DISCRIMINATION OF AGRICULTURAL, FORESTED WETLAND, AND URBAN LAND COVERS **c82**
Dale A. Quattrochi *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop

Results, Vol. 2 Jul. 1984 p 111-112 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

An initial analysis of LANDSAT 4 Thematic Mapper (TM) data for the discrimination of agricultural, forested wetland, and urban land covers is conducted using a scene of data collected over Arkansas and Tennessee. A classification of agricultural lands derived from multitemporal LANDSAT Multispectral Scanner (MSS) data is compared with a classification of TM data for the same area. Results from this comparative analysis show that the multitemporal MSS classification produced an overall accuracy of 80.91% while the TM classification yields an overall classification accuracy of 97.06% correct. M.A.C.

N84-30415*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

PRELIMINARY EVALUATION OF THEMATIC MAPPER IMAGE DATA QUALITY Abstract Only c82

R. B. MacDonald, F. G. Hall, D. E. Pitts, R. M. Bizzell, S. Yao, C. Sorensen, E. Reyna, and J. Carnes *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 113 Prepared in cooperation with Lockheed Engineering and Management Services Co., Inc., Houston, Tex. ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Thematic Mapper (TM) data from Mississippi County, Arkansas, and Webster County, Iowa, were examined for the purpose of evaluating the image data quality of the TM which was launched on board the LANDSAT-4 spacecraft. Preliminary clustering and principal component analysis indicates that the middle infrared and thermal infrared data of TM appear to add significant information over that of the near IR and visible bands of the multispectral scanner data. Moreover, the higher spatial resolution of TM appears to provide better definition of the edges and the within variability of agricultural fields. The geometric performance of TM data, without ground control correction, was found to exceed expectations. The modulation transfer function for the 1.65 m band was found to agree with prelaunch specifications when the effects of the GSFC cubic convolution and the atmosphere were removed. The band to band registration for the bands within the noncooled focal plane was found to be better than specified. However, the middle infrared and thermal infrared, which are on a separate cooled focal plane were found to be misregistered and were significantly worse than prelaunch specifications. M.G.

N84-30416*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ASSESSMENT OF COMPUTER-BASED GEOLOGIC MAPPING OF ROCK UNITS IN THE LANDSAT-4 SCENE OF NORTHERN DEATH VALLEY, CALIFORNIA c43

Nicholas M. Short *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 114-115 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

Results from a series of geologic classifications conducted on a thematic mapper subscene of the northern Death Valley, California are reported. Measurements of accuracy are made through comparison with the 1977 edition of the Death Valley geologic sheet. This employs a simplified map version which is registered by computer to the image data base, allowing a pixel by pixel match with the classified scene. The results show accuracy ranges from 36 to 79% depending on the type of classifier used and the statistical adjustments made to the data. Accuracy values in identifying geologic units were 2 to 3 times higher for those in the relatively flat valleys than for units in the rugged mountainous terrain. Improvements in accuracy will be sought by correcting for slope/aspect variations in mountainous terrain using topographic data recorded in Defense Mapping Agency (DMA) tapes. The above classification results will also be compared with ratio and principal component image classifications made from the same scene. M.G.

N84-30417*# Technische Univ., Munich (West Germany). Faculty for Geosciences.

A CONCEPT FOR THE PROCESSING AND DISPLAY OF THEMATIC MAPPER DATA c82

Rupert Haydn *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 116-118 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Multispectral information can best be accessed and evaluated through digital interactive image processing techniques. The potential user community, however, has not reached the level where image processing is being used routinely as a standard tool. Therefore, for the time being, special effort must be put into development of strategies that will guarantee optimal utilization of the spectral information contained in remote sensing data acquired under the varying conditions affecting each scene. The Thematic Mapper system provides spectral information in seven carefully selected spectral bands, covering the visible, near IR, short-wave IR and thermal IR region of the electromagntic spectrum. The challenge is to devise the best approach for presenting this complex spectral information in a pictorial format which can be understood and accepted as a standard by the growing user community. M.G.

N84-30418*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

QUICK LOOK ANALYSIS OF TM DATA OF THE WASHINGTON, DISTRICT OF COLUMBIA AREA c82

Darrel L. Williams, James R. Irons, Brian L. Markham, Richard S. Latty (Maryland Univ., College Park), and Mark L. Stauffer (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 119-120 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

A fixed factor analysis-of-variance (ANOVA) approach was used to quantify the impact of each TM sensor characteristic (spectral, spatial, and radiometric resolutions) on classification accuracy. All assessments were made relative to MSS sensor characteristics, and the impact of each characteristic was assessed individually, and in all possible combinations. Thematic Mapper data acquired over the Washington, D.C. area on November 2, 1982 were utilized to conduct the experiment. The following results were obtained: the reduction of quantization level from eight bits to six bits caused a decrease in overall accuracy (7%); the use of only three bands (TM 2, 3 and 4) covering the isible and near infrared portion of the spectrum caused a decrease in overall accuracy (7%); and the decrease in spatial resolution resulted in an increase in overall accuracy (4%). Results indicate that the increased radiometric and spectral resolution of the TM instrument do provide increased information content. The result of the spatial resolution degradation is somewhat misleading, in that the result is more a function of spatial resolution. M.G.

N84-30419*# Delaware Univ., Newark. Coll. of Marine Studies.

ABOVEGROUND BIOMASS ESTIMATION IN A TIDAL BRACKISH MARSH USING SIMULATED THEMATIC MAPPER SPECTRAL DATA c43

Michael Hardisky and V. Klemas *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 121-127 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08H

Spectral radiance data were collected from the ground and from a low altitude aircraft in an attempt to gain some insight into the potential utility of actual Thematic Mapper data for biomass estimation in wetland plant communities. No attempt was made to distinguish individual plant species within brackish marsh plant associations. Rather, it was decided to lump plant species with similar canopy morphologies and then estimate from spectral radiance data the biomass of the group. The rationale for such an approach is that plants with a similar morphology will produce a similar reflecting or absorping surface (i.e., canopy) for incoming electromagnetic radiation. Variations in observed reflectance from different plant communities with a similar canopy morphology are more likely to be a result of biomass differences than a result of differences in canopy architecture. If the hypothesis that plants with a similar morphology exhibit similar reflectance characteristics is true, then biomass can be estimated based on a model for the dominant plant morphology within a plant association and the need for species discrimination has effectively been eliminated. M.G.

N84-30420*# Agricultural Research Center, Beltsville, Md. Hydrology Lab.
COMPARISON OF THE INFORMATION CONTENT OF DATA FROM THE LANDSAT-4 THEMATIC MAPPER AND THE MULTI-SPECTRAL SCANNER Abstract Only **c82**
John C. Price *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 128 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Simultaneous data acquisition by the LANDSAT-4 Thematic Mapper (TM) and the multispectral scanner (MSS) permits the comparison of the two types of image data with respect to engineering performance and data applications. The information contained in five matching scenes in agricultural areas is evaluated for the visible and near-IR channels, leading to the conclusion that the TM provides a significant advance in information gathering capability as expressed in terms of either bits per pixel or bits per unit area. M.G.

N84-30421*# Technicolor Graphic Services, Inc., Sioux Falls, S. Dak.
STUDY OF THEMATIC MAPPER AND MULTISPECTRAL SCANNER DATA APPLICATIONS **c35**
F. G. Sadowski, R. H. Haas, J. A. Sturdevant, W. H. Anderson, P. M. Seevers, J. W. Feuquay, L. K. Balick, F. A. Waltz, and D. T. Lauer (EROS Data Center, Sioux Falls, S. Dak.) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 129-132 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

The U.S. Geological Survey EROS Data Center evaluated the utility of LANDSAT multispectral scanner (MSS) and Thematic Mapper (TM) data for natural resource assessment and land cover information, emphasizing manual interpretation and digital classification of the data for U.S. Department of the Interior applications. In most cases, substantially more information was derived from TM data than from MSS data. The test areas included Washington, D.C. and prairie regions of South Dakota and Kansas. M.G.

N84-30422*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THEMATIC MAPPER DATA QUALITY AND PERFORMANCE ASSESSMENT IN RENEWABLE RESOURCES/AGRICULTURE REMOTE SENSING Abstract Only **c82**
Robert M. Bizzell and Harold L. Prior *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 133-134 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

It is believed that the increased spatial resolution will provide solutions to proportion estimation error due to mixed pixels, and the increased spectral resolution will provide for the identification of important agricultural features such as crop stage, and condition. The results of analyses conducted relative to these hypothesis from sample segments extracted from the 4-band Detroit scene and the 7-band Mississippi County, Arkansas engineering test scene are described. Several studies were conducted to evaluate the geometric and radiometric performance of the TM to determine data viability for the more pertinent investigations of TM utility. In most cases this requirement was more than sufficiently satisfied. This allowed the opportunity to take advantage of detailed ground observations for several of the sample segments to assess class separability and detection of other important features with TM. The results presented regarding these TM characteristics show that not only is the increased definition of the within scene variance captured by the increased spatial and spectral resolution, but that the mid-IR bands (5 and 7) are necessary for optimum crop type classification. Both qualitative and quantitative results are presented that describe the improvements gained with the TM both relative to the MSS and on its own merit. M.G.

N84-30423*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRELIMINARY COMPARISONS OF THE INFORMATION CONTENT AND UTILITY OF TM VERSUS MSS DATA Abstract Only **c82**
Brian L. Markham *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 135-136 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Comparisons were made between subscenes from the first TM scene acquired of the Washington, D.C. area and a MSS scene acquired approximately one year earlier. Three types of analyses were conducted to compare TM and MSS data: a water body analysis, a principal components analysis and a spectral clustering analysis. The water body analysis compared the capability of the TM to the MSS for detecting small uniform targets. Of the 59 ponds located on aerial photographs 34 (58%) were detected by the TM with six commission errors (15%) and 13 (22%) were detected by the MSS with three commission errors (19%). The smallest water body detected by the TM was 16 meters; the smallest detected by the MSS was 40 meters. For the principal components analysis, means and covariance matrices were calculated for each subscene, and principal components images generated and characterized. In the spectral clustering comparison each scene was independently clustered and the clusters were assigned to informational classes. The preliminary comparison indicated that TM data provides enhancements over MSS in terms of (1) small target detection and (2) data dimensionality (even with 4-band data). The extra dimension, partially resultant from TM band 1, appears useful for built-up/non-built-up area separation. M.G.

N84-30424*# Delaware Univ., Newark. Coll. of Marine Studies.
PARAMETRIC AND NONPARAMETRIC ANALYSIS OF LANDSAT TM AND MSS IMAGERY FOR DETECTING SUBMERGED PLANT COMMUNITIES **c82**
Steven G. Ackleson and Vytautas Klemas *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 137-140 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

The spatial, spectral and radiometric characteristics of LANDSAT TM and MSS imagery for detecting submerged aquatic vegetation are assessed. The problem is approached from two perspectives; purely stochastic or nonparametric in a radiative sense and theoretical in which radiative transfer equations are used to predict upwelling radiance at satellite altitude. The spectral and radiometric aspects of the theoretical approach are addressed with which a submerged plant canopy is distinguished from a surrounding bottom of sand or mud. M.G.

N84-30425*# Department of Agriculture, Washington, D.C.
A FIRST EVALUATION OF LANDSAT TM DATA TO MONITOR SUSPENDED SEDIMENTS IN LAKES Abstract Only **c82**
F. R. Schiebe, J. C. Ritchie, and G. O. Boatwright *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 141 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

A comparison was made between ground data collected from Lake Chicot, Arkansas, and Thematic Mapper (TM) data collected on September 23, 1982. A preliminary analysis of limited data indicate tht Thematic Mapper data may be useful in monitoring suspended sediment and chlorophyll in a lake with high suspended sediment loads. Total suspended loads ranged from 168 to

508 mg/l. TM Band 3 appears to be most useful with Bands 1, 2 and 4 also containing useful information relative to suspended sediments. Considering water data only, Bands 1, 2 and 3 appear to provide similar information. Bands 3 and 4 are also significantly related. Bands 5 and 7 appear to have independent information content relative to the presence or absence of water. Insufficient range of water temperature ground truth data made an evaluation of TM Band 6 difficult. M.G.

N84-30426*# California Univ., Santa Barbara.

SNOW REFLECTANCE FROM LANDSAT-4 THEMATIC MAPPER c43

Jeff Dozier *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 142-147 refs ERTS (For primary document see N84-30380 20-42)

Avail: NTIS HC A09/MF A01 CSCL 08L

In California 75% of the agricultural water supply comes from the melting Sierra Nevada snowpack. Basin-wide albedo measurements from the LANDSAT-4 Thematic Mapper could be used to better forecast the timing of the spring runoff, because these data can be combined with solar radiation calculations to estimate the net radiation budget. The TM is better-suited for this purpose than the MSS because of its large dynamic range. Saturation still occurs in bands 1-4, but is severe only in band 1. Differentiation of snow optical grain size is possible with TM band 4 through a moderately clear atmosphere. The TM band 5 can discriminate clouds from snow, and the combination of bands 2 and 5 appears best for snow mapping. Author

N84-30427*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

PRELIMINARY EVALUATION OF TM FOR SOILS INFORMATION Abstract Only c43

David R. Thompson, Keith E. Henderson, A. Glen Houston, and David E. Pitts *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 148 ERTS (For primary document see N84-30380 20-42)

Avail: NTIS HC A09/MF A01 CSCL 08M

Thematic mapper data acquired over Mississippi County, Arkansas, were examined for utility in separating soil associations within generally level alluvium deposited by the Mississippi River. The 0.76 to 0.90 micron (Band 4) and the 1.55 to 1.75 micron (Band 5) were found to separate the different soil associations fairly well when compared to the USDA-SCS general soil map. The thermal channel also appeared to provide information at this level. A detailed soil survey was available at the field level along with ground observations of crop type, plant height, percent cover and growth stage. Soils within the fields ranged from uniform to soils that occur as patches of sand that stand out strongly against the intermingled areas of dark soil. Examination of the digital values of individual TM bands at the field level indicates that the influence of the soil is greater in TM than it was in MSS bands. The TM appears to provide greater detail of within field variability caused by soils than MSS and thus should provide improved information relating to crop and soil properties. However, this soil influence may cause crop identification classification procedures to have to account for the soil in their algorithms. M.G.

N84-30428*# Natural Environment Research Council, Swindon (England).

THE USE OF THEMATIC MAPPER DATA FOR LAND COVER DISCRIMINATION: PRELIMINARY RESULTS FROM THE UK SATMAP PROGRAMME c43

M. J. Jackson, J. R. Baker, J. R. G. Townshend, J. E. Gayler, and J. R. Hardy *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 149-152 Prepared in cooperation with Reading Univ., England ERTS (For primary document see N84-30380 20-42)

Avail: NTIS HC A09/MF A01 CSCL 08B

In assessing the accuracy of classification techniques for Thematic Mapper data the consistency of the detector-to-detector response is critical. Preliminary studies were undertaken, therefore, to assess the significance of this factor for the TM. The overall structure of the band relationships can be examined by principal component analysis. In order to examine the utility of the Thematic Mapper data more carefully, six different land cover classes approximately Anderson level 1 were selected. These included an area of water from the sediment-laden Mississippi, woodland, agricultural land and urban land. A plume class was also selected which includes the plume of smoke emanating from the power station and drifting over the Mississippi river. M.G.

N84-30429*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

LANDSAT-4 THEMATIC MAPPER SCENE CHARACTERISTICS FOR A SUBURBAN AND REGIONAL TEST SITE c43

David L. Toll *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 153-159 refs ERTS (For primary document see N84-30380 20-42)

Avail: NTIS HC A09/MF A01 CSCL 08B

The primary objective of this effort is to study the LANDSAT Thematic Mapper land use/land cover discrimination performance from a spatial resolution, spectral region and radiometric perspective. Selected methods to improve the land use/land cover performance are also evaluated. Author

N84-30430*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

FINAL COMPARISON OF TM AND MSS DATA FOR SURFACE MINE ASSESSMENT IN LOGAN COUNTY, WEST VIRGINIA c82

R. G. Witt, H. W. Blodget, and R. M. Marcell (Scientific Applications Research, Riverdale, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 160-166 refs ERTS (For primary document see N84-30380 20-42)

Avail: NTIS HC A09/MF A01 CSCL 08I

A variety of classifications during both raw and transformed MSS and TM data sets from 4 September 1982 were performed for the Logan County, West Virginia study area. The object was to compare the utility of TM and MSS data for delineating small, irregular ground features, particularly surface mines, and also to test data reduction/transformation techniques (band selection, canonical analysis, and principal components) in relation to a traditional means of unsupervised classification. Statistical results demonstrate that, on the average, the TM classifications yielded an overall .53 factor of improvement relative to the MSS classifications. When the accuracies for only three minor (in terms of areal extent) land use categories are examined, the factor of improvement for TM over MSS increases to 1.48; i.e., the TM is nearly one and one-half times better than the MSS for delineating small and irregular ground features such as contour strip mines. M.G.

N84-30431*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

COMPARISON OF LAND COVER INFORMATION FROM LANDSAT MULTISPECTRAL SCANNER (MSS) AND AIRBORNE THEMATIC MAPPER SIMULATOR (TMS) DATA FOR HYDROLOGIC APPLICATIONS c43

J. C. Gervin, Y. C. Lu (Computer Sciences Corp., Silver Spring, Md.), and R. F. Marcell (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 167-170 ERTS (For primary document see N84-30380 20-42)

Avail: NTIS HC A09/MF A01 CSCL 08B

Detailed land cover classifications were performed on the Thematic Mapper Simulator (TMS) and MSS data of the Clinton River Basin (acquired on August 19, 1981, and June 28, 1980, respectively) using supervised classification techniques. Differences in interclass separability were compared to select several promising TMS band combinations, selected from the 27 covering the Clinton River Basin. The TMS data produced a more accurate and spatially contiguous classification than MSS for this study site. While the accuracy of the 4-band TM data set was as good as the 7-band, the 3-band TMS data sets were also better than the

MSS. These results indicate that both the increased spectral discrimination and spatial resolution contribute to improved classification accuracy. The possibility of reducing the data analysis burden associated with large TM data volumes through effective band selection therefore appears promising. The implications of the improved classification accuracy of TMS data are important for hydrologic and economic modeling. In particular, the higher accuracies for the developed categories (residential and commercial) should improve the predictions of runoff in flood forecasting models and of flood damage for damage calculation models appreciably. M.G.

N84-30432*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RELATIVE ACCURACY ASSESSMENT OF LANDSAT-4 MSS AND TM DATA FOR LEVEL 1 LAND COVER INVENTORY c82
E. M. Middleton, R. G. Witt, Y. C. Lu (Computer Sciences Corp., Silver Spring, Md.), and R. S. Sekhon (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 171-172 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

Digital data for the Washington, D.C. scene from the LANDSAT-4 Multispectral Scanner (MSS) and the LANDSAT-4 Thematic Mapper (TM) are compared. Classification success for the TM and MSS data sets was determined by a per pixel comparison with digitized ground verification data (GVD). These GVD were comprised of Level I land cover (developed, agriculture, forest, water, wetlands, and barren) for four USGS 7.5-minute topographic quadrangle maps. Classification accuracy was computed as an average value and for each cover type. Accuracy was expressed two ways: (1) as the percent correspondence with GVD (% correct) and (2) as the percent correspondence relative to both the GVD and LANDSAT classification schemes. Errors of omission and commission associated with the LANDSAT classifications were also computed. Specific results are discussed. M.G.

N84-30433*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EARTH OBSERVING SYSTEM. VOLUME 1, PART 2: SCIENCE AND MISSION REQUIREMENTS. WORKING GROUP REPORT APPENDIX
Washington Aug. 1984 58 p
(NASA-TM-86129; NAS 1.15:86129) Avail: NTIS HC A04/MF A01 CSCL 08G

Areas of global hydrologic cycles, global biogeochemical cycles geophysical processes are addressed including biological oceanography, inland aquatic resources, land biology, tropospheric chemistry, oceanic transport, polar glaciology, sea ice and atmospheric chemistry. For individual titles, see N84-30434 through N84-30449.

N84-30434*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GLOBAL HYDROLOGIC CYCLE c43
Albert Rango *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A1-A4 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08H

One of the major scientific questions in hydrology is: Can remote sensing data be used effectively with models to improve our understanding of hydrologic processes? Virtually all hydrologic models, with only a few exceptions, were designed to interface with conventional point data. These models must be modified or new ones developed to be compatible with remote sensing capabilities (areal coverage, high spatial resolution, repetitiveness, etc.). A comprehensive program of development and testing of these models at various application scales ranging from flash flood modeling and small tributary streams to continental size general circulation models must be carried out. Author

N84-30435*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GLOBAL BIOGEOCHEMISTRY: AN OVERVIEW c43
Berrien Moore, III *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A5-A7 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08B

The dynamic biogeochemical equilibria among the major pools of carbon, nitrogen, sulfur, and phosphorus represented by terrestrial biomes, the world's oceans, and the troposphere are disturbed. Since even the most rapid processes of adjustments among the reservoirs take decades, new equilibria are far from established. These human-induced perturbations and the system's subsequent responses constitute an on-going biogeochemical experiment at the global level. Current and new information must be combined in a way that allows testing of various hypotheses about the workings of global biogeochemical systems. This enables assessment of current knowledge and evaluation of the gaps.B.G.

N84-30436*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BIOGEOCHEMICAL CONSIDERATIONS c43
C. C. Delwiche *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A8-A10 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08B

Some questions relating to biogeochemical cycles and the nature of the biosphere driving them is best approached by means of remote (satellite) monitoring. Important among these are the distribution of various ecosystems and the boundaries between them, the extent and rate of modification of ecosystems by human or other factors, and various climatic and physical factors affecting ecosystem performance as influenced by human or natural processes. Author

N84-30437*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BIOLOGICAL OCEANOGRAPHY c48
Mark R. Abbott *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A11-A14 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08A

Within the framework of global biogeochemical cycles and ocean productivity, there are two areas that will be of particular interest to biological oceanography in the 1990s. The first is the mapping in space time of the biomass and productivity of phytoplankton in the world ocean. The second area is the coupling of biological and physical processes as it affects the distribution and growth rate of phytoplankton biomass. Certainly other areas will be of interest to biological oceanographers, but these two areas are amenable to observations from satellites. Temporal and spatial variability is a regular feature of marine ecosystems. The temporal and spatial variability of phytoplankton biomass and productivity which is ubiquitous at all time and space scales in the ocean must be characterized. Remote sensing from satellites addresses these problems with global observations of mesocale (2 to 20 days, 10 to 200 km) features over a long period of time. B.G.

N84-30438*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INLAND AQUATIC RESOURCES AND BIOGEOCHEMICAL CYCLES c45
John M. Melack *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A15-A17 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 13B

The biosphere is the entire planetary system that includes, sustains and is influenced by life. The central issue of the science of the biosphere is the extent to which the Earth's surface, atmosphere and hydrosphere is the result of biological rather than abiotic processes. Space science and technology accelerates the understanding of global biological processes by providing repetive synoptic observations on large spatial scales once the relationships between the processes and the remotely sensed quantities are established. Especially promising applications of space technology are the measurement of biological productivity and portions of geochemical cycles in aquatic ecosystems and the evaluation and management of the quality of freshwater resources. Author

N84-30439*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FOREST ENVIRONMENTS c43
Paul Zinke *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A18-A20 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 02F

The application of remote sensing measurement techniques to scientific questions involving forests is a necessity because of the extent of forests, their variability, and the need to measure their interaction with environmental processes. The synoptic view given by remote sensing data of the extent, variability, and relation to environmental processes involving energy balances, disposition of water, and tree growth in relation to elemental storage of carbon, nitrogen and other essential elements is essential to understanding the forest in a scientific way. The ability to make comparisons in these properties at various intervals allows the determination of process functions and rates where the forest affects environmental properties. The ultimate objective in using these data is to define the extent of the forest and wildland resource, to determine the changes that are occurring in the resource due to utilization by man under conditions of changing market and population demands, and to evaluate the correlated changes occurring in various environmental properties influenced by forest vegetation on a local as well as global scale. Author

N84-30440*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAND BIOLOGY c45
Edward T. Kanemasu *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A21-A23 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 13B

The advancing technology of our civilization on Earth affects our environment on a local, regional and global scale. Local effects can feed into larger scale effects because of positive feedbacks in our system. The ability to understand, quantify and predict the large scale and long-term effects of technology is truly mind boggling. The understanding of these effects, which is paramount to the quality of life on Earth, will depend upon the ability to interact with scientists from the biological, atmospheric, oceanographic and geological sciences and develop a common communication system and unified objectives. Author

N84-30441*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TROPOSPHERIC CHEMISTRY c46
Volker Mohnen *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A24-A27 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

The fundamental processes that control the chemical composition and cycles of the global troposphere and how these processes and properties affect the physical behavior of the atmosphere are examined. The long-term information needs for tropospheric chemistry are: to be able to predict tropospheric responses to perturbations, both natural and anthropogenic, of these cycles, and to provide the information required for the maintenance and effective future management of the atmospheric component of our global life support system. The processes controlling global tropospheric biogeochemical cycles include: the input of trace species into the troposphere, their long-range transport and distribution as affected by the mean wind and vertical venting, their chemical transformations, including gas to particle conversion, leading to the appearance of aerosols or aqueous phase reactions inside cloud droplets, and their removal from the troposphere via wet (precipitation) and dry deposition. B.G.

N84-30442*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEOLOGY c46
Raymond Arvidson *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A28-A30 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08G

Three objectives were outlined: (1) global distribution, geometry and composition of continental rock units; (2) morphology and structure of the continental crust; and (3) monitoring selected surface processes. Mapping soil, sediment and rock characteristics for land surfaces requires the use of visible, reflected, thermal and radio parts of the spectrum. Digital topographic data (elevation, slope angle, slope magnitude) are needed to correct reflectance, emission, and radar data. In addition, images of the topographic data provide fundamental information on the morphology and structure of the land. B.G.

N84-30443*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERIOR OF THE EARTH c46
Roger J. Phillips *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A31-A33 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08G

Basic questions regarding the interior of the Earth in the 1990's are discussed. Research problems in the areas of plate tectonics, the Earth mantle the Earth core, and continental structure are discussed. Observational requirements of the GRAVSAT satellite mission are discussed. R.J.F.

N84-30444*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OCEANIC TRANSPORT c48
Robert Chase and Lawrence McGoldrick *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A34-A36 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08C

The importance of large-scale ocean movements to the moderation of Global Temperature is discussed. The observational requirements of physical oceanography are discussed. Satellite-based oceanographic observing systems are seen as central to oceanography in 1990's. R.J.F.

N84-30445*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
POLAR GLACIOLOGY c43
Gordon deQ. Robin *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A37-A40 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08L

Two fields of research on polar ice sheets are likely to be of dominant interest during the 1990s. These are: the role of polar ice sheets in the hydrological cycle ocean-atmosphere-ice sheets-oceans, especially in relation to climate change; and the study and interpretation of material in deep ice cores to provide improved knowledge of past climates and of the varying levels of atmospheric constituents such as CO2, NOx, SO2, aerosols, etc., over the past 200,000 years. Both topics require a better knowledge of ice dynamics. Many of the studies that should be undertaken in polar regions by Earth Observing System require similar instruments and techniques to those used elsewhere over oceans and inland surfaces. However to study polar regions two special requirements need to be met: Earth Observing System satellite(s) need to be in a sufficiently high inclination orbit to cover most of the polar regions. Instruments must also be adapted, often by relatively limited changes, to give satisfactory data over polar ice. The observational requirements for polar ice sheets in the 1990s are summarized. R.J.F.

N84-30446*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEA ICE c43

Stephen F. Ackley *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A41-A43 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08L

Scientific objectives and observational requirements relative to sea ice studies in the 1990's are discussed. The development of coupled ice-ocean-atmosphere models that provide information comparable to real data sets through interactive processes is discussed. A series of particular problems that would provide the basis for such a verification data set and which is amenable to satellite systems available or realizable over the next 20 years is presented. R.J.F.

N84-30447*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TROPOSPHERIC SCIENCE **c46**
Conway B. Leovy *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A44-A48 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

Now casting, current weather forecasting, extended range forecasting and climate prediction are discussed with an emphasis on the observational requirements of climate prediction. Intergrated hydrologic cycle measurements, cloud parameter characterization, air sea interaction measurements, tropical winds, and tropospheric gaseous species measurements are discussed. R.J.F.

N84-30448*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MIDDLE ATMOSPHERIC SCIENCE **c46**
John C. Gille *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A49-A52 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

Scientific objectives of middle atmosphere research in the 1990's are discussed. Radiative, chemical and dynamical processes in the middle atmosphere; long term evolution of middle atmosphere chemistry; and the interannual variability of middle atmosphere dynamics and transport are among the topics discussed. Observational requirements relative to atmospheric processes, atmospheric chemistry, interannual variability, and the upper mesosphere and lower thermosphere are given. R.J.F.

N84-30449*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AERONOMY **c46**
Paul Hays *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A53-A55 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

The central theme of Aeronomy in the 1990 period will be the formulation of a coupled global view of the upper atmosphere as an integral extension of the lower regions. Photochemistry, atmospheric dynamics, the atmospheric energy, and observational requirements for the 1990's are discussed. R.J.F.

N84-30450*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EARTH OBSERVING SYSTEM. SCIENCE AND MISSION REQUIREMENTS, VOLUME 1, PART 1
Washington Aug. 1984 59 p Original contains color illustrations (NASA-TM-86129-Vol-1-Pt-1; NAS 1.15:86129-Vol-1-Pt-1) Avail: NTIS HC A04/MF A01 CSCL 12B

The Earth Observing System (EOS) is a planned NASA program, which will carry the multidisciplinary Earth science studies employing a variety of remote sensing techniques in the 1990's, as a prime mission, using the Space Station polar platform. The scientific rationale, recommended observational needs, the broad system configuration and a recommended implementation strategy to achieve the stated mission goals are provided. For individual titles, see N84-30451 through N84-30454.

N84-30451*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EARTH OBSERVING SYSTEM, INTRODUCTION
In its Earth Observing System. Sci. and Mission Requirements, Vol. 1, Part 1 Aug. 1983 p 1-11 (For primary document see N84-30450 20-42)
Avail: NTIS HC A04/MF A01 CSCL 12B

Much is known about the Earth, but the unifying concepts are still only beginning to be established. An exposition of the key issues in Earth science is neither simple or concise. From the scientific questions at hand there are many interconnections among them and the view of the Earth as a system is essential to their solution. The Earth science goals for the 1990's are presented for the following areas: hydrologic cycle; biogeochemical cycles; climatological processes; geophysical processes; oceanography; and solid earth. B.G.

N84-30452*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OBSERVATIONAL REQUIREMENTS AND MEASUREMENT SYSTEMS CONCEPTS
In its Earth Observing System. Sci. and Mission Requirements, Vol. 1, Part 1 Aug. 1984 p 12-14 (For primary document see N84-30450 20-42)
Avail: NTIS HC A04/MF A01 CSCL 12B

Six philosophical elements that a measurement strategy for dynamic qualities should contain are: systemic global observations; nested coverage; continuous upgrading of observational capability and testing of promising instrument concepts; orbit considerations; quality control: data validity and management; and data interpretation. The criteria for determining an observational program should include the following: significance of the primary scientific questions, technical readiness; potential of undeveloped techniques, engineering and economic feasibility; and data access and data systems. B.G.

N84-30453*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IMPLEMENTATION STRATEGY
In its Earth Observing System. Sci. and Mission Requirements, Vol. 1, Part 1 Aug. 1983 p 15-48 (For primary document see N84-30450 20-42)
Avail: NTIS HC A04/MF A01 CSCL 12B

Meeting the identified needs of Earth science requires approaching EOS as an information system and not simply as one or more satellites with instruments. Six elements of strategy are outlined as follows: implementation of the individual discipline missions as currently planned; use of sustained observational capabilities offered by operational satellites without waiting for the launch of new mission; put first priority on the data system; deploy an Advanced Data Collection and Location System; put a substantial new observing capability in a low Earth orbit in such a way as to provide for sustained measurements; and group instruments to exploit their capabilities for synergism; maximize the scientific utility of the mission; and minimize the costs of implementation where possible. B.G.

N84-30454*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EARTH OBSERVING SYSTEM, CONCLUSIONS AND RECOMMENDATIONS
In its Earth Observing System. Sci. and Mission Requirements, Vol. 1, Part 1 Aug. 1984 p 49-51 (For primary document see N84-30450 20-42)
Avail: NTIS HC A04/MF A01 CSCL 12B

The following Earth Observing Systems (E.O.S.) recommendations were suggested: (1) a program must be initiated to ensure that present time series of Earth science data are maintained and continued. (2) A data system that provides easy, integrated, and complete access to past, present, and future data must be developed as soon as possible. (3) A long term research effort must be sustained to study and understand these time series of Earth observations. (4) The E.O.S. should be established as an information system to carry out those aspects of the above recommendations which go beyond existing and currently planned activities. (5) The scientific direction of the E.O.S. should be established and continued through an international scientific steering committee. B.G.

N84-30455*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
[RESEARCH ACTIVITIES OF THE GEODYNAMICS BRANCH] Annual Summary Report, 1983
Werner D. Kahn, ed. and Steven C. Cohen, ed. Jun. 1984 121 p refs Submitted for publication
(NASA-TM-86123; NAS 1.15:86123; ASR-2) Avail: NTIS HC A06/MF A01 CSCL 08G

A broad spectrum of geoscience disciplines including space geodesy, geopotential field modeling, tectonophysics, and dynamic oceanography are discussed. The NASA programs, include the Geodynamics and Ocean Programs, the Crustal Dynamics Project, the proposed Ocean Topography Experiment (TOPEX), and the Geopotential Research Mission (GRM). The papers are grouped into chapters on Crustal Movements, Global Earth Dynamics, Gravity Field Model Development, Sea Surface Topography, and Advanced Studies. For individual titles, see N84-30456 through N84-30474.

N84-30456*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
UPDATE: SAN ANDREAS FAULT EXPERIMENT c46
Demosthenes C. Christodoulidis and David E. Smith *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08G

Satellite laser ranging techniques are used to monitor the broad motion of the tectonic plates comprising the San Andreas Fault System. The San Andreas Fault Experiment, (SAFE), has progressed through the upgrades made to laser system hardware and an improvement in the modeling capabilities of the spaceborne laser targets. Of special note is the launch of the Laser Geodynamic Satellite, LAGEOS spacecraft, NASA's only completely dedicated laser satellite in 1976. The results of plate motion projected into this 896 km measured line over the past eleven years are summarized and intercompared. M.A.C.

N84-30457*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CRUSTAL DEFORMATION AND EARTHQUAKES c46
Steve C. Cohen *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08K

The manner in which the Earth's surface deforms during the cycle of stress accumulation and release along major faults is investigated. In an investigation of the crustal deformation associated with a thin channel asthenosphere displacements are reduced from those computed for a half space asthenosphere. A previous finding by other workers that displacements are enhanced when flow is confined to a thin channel is based on several invalid approximations. The major predictions of the finite element model are that the near field postseismic displacements and strain rates are less than those for a half space asthenosphere and that the postseismic strain rates at intermediate distances are greater (in magnitude). The finite width of the asthenosphere ceases to have a significant impact on the crustal deformation pattern when its magnitude exceeds about three lithosphere thicknesses. M.A.C.

N84-30458*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RESULTS OF LASER RANGING COLLOCATIONS DURING 1983 c36
Ronald Kolenkiewicz *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 20E

The objective of laser ranging collocations is to compare the ability of two satellite laser ranging systems, located in the vicinity of one another, to measure the distance to an artificial Earth satellite in orbit over the sites. The similar measurement of this distance is essential before a new or modified laser system is deployed to worldwide locations in order to gather the data necessary to meet the scientific goals of the Crustal Dynamics Project. In order to be certain the laser systems are operating properly, they are periodically compared with each other. These comparisons or collocations are performed by locating the lasers side by side when they track the same satellite during the same time or pass. The data is then compared to make sure the lasers are giving essentially the same range results. Results of the three collocations performed during 1983 are given. Author

N84-30459*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A COMPARISON BETWEEN LAGEOS LASER RANGING AND VLBI DETERMINED BASELINES c36
Ronald Kolenkiewicz and James W. Ryan *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 20E

Two independent measurement techniques, Lageos satellite laser ranging (SLR), and very long baseline interferometry (VLBI) are compared in the measurement of distances (or baselines) between several locations in the continental U.S. The results of this analysis is summarized where both the SLR and VLBI baseline lengths and their differences (SLR minus VLBI) are presented. A comparison of the 22 baselines shows a mean difference of 1.0 + or - 1.1 cm with a scatter about zero of 5.2 cm. No apparent systematic scale difference between the networks is evident. A map of the baselines is included and indicates their differences, SLR minus VLBI, in centimeters. M.A.C.

N84-30460*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEODYNAMICS OF CRUSTAL DEFORMATION AND SEISMOTECTONIC BLOCK MOVEMENTS IN CENTRAL EUROPE c46
Han-Shou Liu *In its* Res. Activities of the Geodyn. Branch Jun. 1984 8 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08K

Geological observations reveal the style of neotectonic near-surface stresses and deformations in central Europe. Seismic activity, focal depths and fault plane solutions of earthquakes indicate kinematic reactions within the crust. A crustal deformation model which may account for the Rhine graben systems and the associated seismotectonic block movements in Europe is presented. A computer aided tomography to gravity anomalies is used in determining the crustal stresses in central Europe. Tomographical interpretations of gravity data with respect to seismic stresses are discussed. Kinematics and dynamics are integrated to show that the measured regional stresses in central Europe are derivable from the convection generated traction on the boundary of the elastic spherical shell of the crust as inferred from satellite derived gravity data. M.A.C.

N84-30461*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SENSITIVITY OF SLR BASELINES TO ERRORS IN EARTH ORIENTATION c43
David E. Smith and Demos C. Christodoulidis *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08E

The sensitivity of inter station distances derived from Satellite Laser Ranging (SLR) to errors in Earth orientation is discussed. An analysis experiment is performed which imposes a known polar motion error on all of the arcs used over this interval. The effect of the averaging of the errors over the tracking periods of individual sites is assessed. Baselines between stations that are supported by a global network of tracking stations are only marginally affected by errors in Earth orientation. The global network of stations retains its integrity even in the presence of systematic changes in the coordinate frame. The effect of these coordinate frame changes on the relative locations of the stations is minimal. M.A.C.

N84-30462*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ANALYSIS OF THE EARTH'S VARIABLE ROTATION c46
B. Fong Chao *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08E

The objective was to analyze the Earth's rotation, and to compare the observations with the atmospheric and seismic excitation functions. The variation in the Earth's rotation can be separated into the length-of-day (LOD) variation and the polar motion. Possible driving mechanisms include: atmospheric/oceanic circulations, seismic activities, solar-lunar tides, mantle convection, core-mantle coupling, and solar activities. The major problem of concern was the identification of these dynamical processes as primary driving mechanisms for the various features in the variation of the Earth's rotation. R.J.F.

N84-30463*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEASAT OBSERVATIONS OF LITHOSPHERIC FLEXURE c46
David C. McAdoo *In its* Res. Activities of the Geodyn. Branch Jun. 1984 7 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08G

Models of lithospheric flexure were tested on SEASAT altimetric observations of the geoid over Outer Rises. These altimeter data were found to provide significant new information about the strength of the oceanic lithosphere. Among the significant results derived from altimeter data is confirmation of the proposition that the effective elastic thickness, T sub e, of the lithosphere increases with age in approximate accord with the relation T sub E approximately equals C times one half the age. SEASAT altimeter data over Outer Rises provide an important constraint on mechanical models of the oceanic lithosphere. These data are quite consistent with an experimentally predicted mechanical model of the lithosphere which indicates that this model may be useful in other geodynamic investigations. R.J.F.

N84-30464*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAGEOS ORBIT AND THE ALBEDO PROBLEM c46
David P. Rubincam *In its* Res. Activities of the Geodyn. Branch Jun. 1984 2 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 04A

The objective was to obtain an analytic expression for the radiation pressure force on a satellite due to sunlight reflected from the Earth. The Lageos satellite undergoes unexplained along-track accelerations. These accelerations are believed to be due mainly to terrestrial radiation pressure. The effect of sunlight reflected off the surface of the Earth must thus be modeled to insure an accurate orbit for Lageos. An accurate orbit is necessary for carrying out Lageos' mission of measuring tectonic plate motion, polar motion, and Earth rotation. The present investigation focuses on a spherical harmonic approach to the problem. An equation for the force was obtained by assuming the Earth's surface reflects sunlight according to Lambert's law. The equation is an integral over the whole Earth's surface. Expressions occurring inside the integral are expressed in terms of spherical harmonics. The problem is thus reduced to integrating products of spherical harmonics. R.J.F.

N84-30465*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAGEOS ORBIT AND SOLAR ECLIPSES c92
David P. Rubincam *In its* Res. Activities of the Geodyn. Branch Jun. 1984 2 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 03B

The objective was to assess the importance of solar eclipses on Lageos' orbit. Solar radiation pressure perturbs the orbit of the Lageos satellite. The GEODYN orbit determination computer program includes solar radiation pressure as one of the forces operating on the satellite as it integrates the orbit. GEODYN also takes into account the extinction of sunlight when Lageos moves into the Earth's shadow. The effect of solar eclipses on the semimajor axis of Lageos' orbit was computed analytically by assuming Lageos to be in a circular orbit, the Sun and the Moon to be in the plane of the orbit, and the Moon to be stationary in the sky in front of the Sun. Also, the magnitude of the radiation pressure is assumed to be linearly related to the angular separation of the Sun and Moon, and that Lageos is a perfect absorber of radiation. The computation indicates that an eclipse of the Sun by the Moon as seen by Lageos can affect the semimajor axis at the 1 centimeter (1 cm) level. Such a change is significant enough to include in GEODYN, in order to get an accurate orbit for Lageos. R.J.F.

N84-30466*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VERIFICATION OF THE ACCURACY OF GEM-L2 IN RESPONSE TO CRITICISM BY LAMBECK AND COLEMAN c13
Francis J. Lerch *In its* Res. Activities of the Geodyn. Branch Jun. 1984 13 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 22A

The objective was to evaluate the accuracy of the Goddard Earth Model (GEM)-L2 and its improvement in estimating Lageos orbits in order to provide better baselines for plate tectonics, improved polar motion and Earth rotation. Analyses and comparisons with other models are made to verify accuracy in contrast to the Lambeck and Coleman result which denied the authors' accuracy estimates. The analysis presented completely verifies the accuracy of the GEM-L2 model and disproves the statistical methods of Lambeck and Coleman rejecting the accuracy of GEM-L2 as published in their report. The baselines derived from Lageos with GEM-L2 were estimated to have a 2 cm uncertainty due to the errors in the GEM-L2 gravity model which is supported by the results given. The calibration tests indicate that the errors in GEM-L2 should be reduced by about 30 percent which is in the opposite direction to the result obtained by Lambeck and Coleman. R.J.F.

N84-30467*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEODYN SYSTEMS DEVELOPMENT c43
Barbara H. Putney *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08G

The purpose of the GEODYN Orbit Determination and Parameter Estimation, the SOLVE and ERODYN Programs is to recover geodetic and geophysical parameters from satellite and other data in a state-of-the-art manner. Continued solutions for gravity field, pole positions, Earth rotation, GM, and baselines were made as part of the Crustal Dynamics Project. Some tidal parameters were recovered as well. The eight digit station identification number was incorporated in the software and new techniques for constraining monthly station parameters to each other are being developed. This is allowing the analysts even more flexibility in the shaping of solutions from monthly sets of normal equations and right-hand sides. R.J.F.

N84-30468*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE ERODYN AND QRPIG COMPUTER PROGRAMS c61
Theodore L. Felsentreger *In its* Res. Activities of the Geodyn. Branch Jun. 1984 3 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 09B

The role of the ERODYN computer program in providing error analyses involving orbital, geodetic, and geophysical parameters is discussed. It was designed to operate as a companion program to the GEODYN orbit determination and parameter estimating program. The Q R Partitioned Eigenvalue/Eigenvector analysis program (QRPIG) is designed to process symmetric matrices with an out-of-core partitioning algorithm for the eigenvectors and eigenvalues of the matrices. R.J.F.

N84-30469*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OCEAN CIRCULATION STUDIES c48
Chester J. Koblinsky *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08C

Remotely sensed signatures of ocean surface characteristics from active and passive satellite-borne radiometers in conjunction with in situ data were utilized to examine the large scale, low frequency circulation of the world's oceans. Studies of the California Current, the Gulf of California, and the Kuroshio Extension Current in the western North Pacific were reviewed briefly. The importance of satellite oceanographic tools was emphasized. R.S.F.

N84-30470*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GLOBAL MEAN SEA SURFACE BASED UPON SEASAT ALTIMETER DATA c48
James G. Marsh *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08J

A global mean sea surface based upon the SEASAT altimeter data was derived. A combination of crossing arc techniques, accurate SEASAT reference orbits, and a previously computed GOES-3/SEASAT mean sea surface were used in the computation process. This mean sea surface provides a basis for the determination of global ocean circulation patterns and for detailed analysis of the Earth's internal structure. A contour map of the global mean sea surface is presented. Author

N84-30471*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN OBJECTIVE ANALYSIS TECHNIQUE FOR EXTRAPOLATING TIDAL FIELDS c48
Braulio V. Sanchez *In its* Res. Activities of the Geodyn. Branch Jun. 1984 8 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08C

An interpolation technique which allows accurate extrapolation of tidal height fields in the ocean basins by making use of selected satellite altimetry measurements and/or conventional gauge measurements was developed and tested. A normal mode solution for the Atlantic and Indian Oceans was obtained by means of a finite difference grid. Normal mode amplitude maps are presented. R.S.F.

N84-30472*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEASAT ALTIMETRY FOR SURFACE HEIGHT OF INLAND SEAS c43
Jean E. Welker *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08J

The capability of spaceborne altimetry to record the level, or monitor changes in the level, of inland seas was assessed. SEASAT altimetry data from Lake Baikal in Siberia; the Caspian, Black, and Aral Seas in the southern Soviet Union; the Great Salt Lake in the United States; lakes and reservoirs in northwestern and central China; and snow cover in northwestern India and on the Tibetan Plateau were examined. R.S.F.

N84-30473*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ACCURACY OF MAPPING THE EARTH'S GRAVITY FIELD FINE STRUCTURE WITH A SPACEBORNE GRAVITY GRADIOMETER MISSION c43
Werner D. Kahn *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08B

The spaceborne gravity gradiometer is a potential sensor for mapping the fine structure of the Earth's gravity field. Error analyses were performed to investigate the accuracy of the determination of the Earth's gravity field from a gravity field satellite mission. The orbital height of the spacecraft is the dominating parameter as far as gravity field resolution and accuracies are concerned. R.S.F.

N84-30474*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOIL MOISTURE FROM TEMPERATURE MEASUREMENTS AT THE EARTH'S SURFACE, UPDATE c43
Jean E. Welker *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08M

Soil moisture budgets at the Earth's surface were investigated based on soil and atmospheric temperature variations. A number of data sets were plotted and statistically analyzed in order to accentuate the existence and the characteristics of mesoscale soil temperature extrema variations and their relations to other parameters. The correlations between diurnal temperature extrema for air and soil in drought and non-drought periods appear to follow different characteristic patterns, allowing an inference of soil moisture content from temperature data. The recovery of temperature extrema after a precipitation event also follows a characteristic power curve rise between two limiting values which is an indicator of evaporation rates. If these indicators are applied universally to regional temperature data, soil moisture content or drought conditions can be inferred directly from temperature measurements. R.S.F.

N84-30475*# National Aeronautics and Space Administration, Washington, D. C.
GEODYNAMICS
L. S. Walter Jul. 1984 61 p Workshop held in Airlie, Va., 15-18 Feb. 1983
(NASA-CP-2325; NAS 1.55:2325) Avail: NTIS HC A04/MF A01 CSCL 08G

The status of space geodynamics is examined, major scientific questions that need to be addressed are identified, and program activities are recommended for the next decade. Progress made in measuring tectonic plates, polar motion, and coupling of fluid motion of the Earth's core to the mantle is reviewed. For individual titles, see N84-30476 through N84-30478.

N84-30476*# National Aeronautics and Space Administration, Washington, D. C.
GEODYNAMICS: INTRODUCTION AND BACKGROUND
In its Geodyn. Jul. 1984 p 7-25 (For primary document see N84-30475 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08G

An overview is given of the field of geodynamics and its major scientific questions. The NASA geodynamics program is described as well as its status and accomplishments projected by 1988. Federal coordination and international cooperation in monitoring tectonic plate motion, polar motion, and Earth rotation are mentioned. The development of a GPS receiver for civilian geodesy and results obtained using satellite laser ranging and very long baseline interferometry in measuring crustal dynamics, global dynamics, and the geopotential field are reported. A.R.H.

N84-30477*# National Aeronautics and Space Administration, Washington, D. C.
PROJECTION FOR SPACE GEODYNAMICS, 1988-1998
In its Geodyn. Jul. 1984 p 27-44 (For primary document see N84-30475 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08G

Premises defining the technical and operational environment of the next decade are listed. Observational programs required to satisfy scientific objectives in the study of geopotential fields, global dynamics, tectonics, and regional tectonics/crustal hazards are defined. Capabilities and applications of the Geopotential Research Mission to be launched in the early 1990's are explored and the benefits of more detailed measurements of the Moon and planets are indicated. Earthquake prediction in the western part of the

U.S. is discussed. The use of decimeter, centimeter, and millimeter systems for very long baseline interferometry, satellite laser ranging, and lunar ranging techniques are discussed. Geographic regions of particular interest are identified. A.R.H.

N84-30478*# National Aeronautics and Space Administration, Washington, D. C.
RECOMMENDED PROGRAM ACTIVITIES, 1988-1998
In its Geodyn. Jul. 1984 p 45-49 (For primary document see N84-30475 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08G

The observations needed from the standpoint of measurement programs are considered and the technologies which must be developed and the flight missions which must be carried out to support ground-based measurements are discussed. Instrument development for millimeter accuracy in both the horizontal and vertical components as well as for sensitivity to short wavelengths is discussed. Algorithms and models in the application of space data in geodynamics demand special attention. Continued development of airborne and spaceborne laser ranging systems should be supported. A.R.H.

N84-30479# Joint Publications Research Service, Arlington, Va.
USSR REPORT: EARTH SCIENCES
13 Aug. 1984 89 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UES-84-006) Avail: NTIS HC A05/MF A01

This USSR report contains research information in the area of earth sciences. Subject matter covered includes: meteorology; oceanography; terrestrial geophysics; and atmospheric physics. For individual titles, see N84-30480 through N84-30494.

N84-30480# Joint Publications Research Service, Arlington, Va.
INEVITABLE CLIMATIC CHANGES c47
M. Budyko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 1-12 refs Transl. into ENGLISH from Znaniye - Sila (Moscow), no. 4, Apr. 1984 p 18-20, 46 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

A powerful eruption of Agung Volcano occurred in March 1963 on Bali Island in Indonesia. Although such eruptions of an explosive character have long been known this event drew very close attention from scientists. The eruption, or to be more exact, the events which followed it, were of the greatest interest to climatologists. The relationship between volcanic activity and variations of climate on the Earth is studied. This is an important natural mechanism because it is capable of exerting a rapid influence on the climatic situation. B.W.

N84-30481# Joint Publications Research Service, Arlington, Va.
RESULTS OF OCEAN-ATMOSPHERE INTERACTION STUDIES IN WEST ATLANTIC c47
In its USSR Repr.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 26-27 refs Transl. into ENGLISH from Komsomolskaya Pravda (Vilnius, USSR), 16 Jun. 1984 p 3 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

A model of ocean-atmosphere interaction can be developed which will forecast the weather for periods as long as a year, for example. The latest major expedition of scientists for the purpose of gathering information necessary for a future model was sent to the northwest part of the Atlantic in the fall of last year. This expedition traveled on board the Akademik Kurchatov and the Vityaz, scientific research vessels of the USSR Academy of Sciences. The results of this expedition are discussed. B.W.

N84-30482# Joint Publications Research Service, Arlington, Va.
SPATIAL DISTRIBUTION OF ADVECTIVE HEAT INFLUXES IN ATMOSPHERE OVER NORTHERN HEMISPHERE AND ITS RELATIONSHIP TO HEAT INFLUXES FROM OCEAN Abstract only c46
S. E. Rakshnya *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 44-45 refs Transl. into ENGLISH from Okeanol. (Moscow), vol. 24, no. 2 Mar. - Apr. 1984 p 258-262 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

The authors have analyzed the spatial distribution of advective heat influxes in the atmosphere over the Northern Hemisphere on the basis of aeroclimatic data and its relationship to heat exchange between the atmosphere and ocean. As a point of departure, a formula is written for the heat influx due to macroscale atmospheric movements in a unit air column with a height Z. The parameter Z represents the height of 500-mb isobaric surface, selected because the influence of the ocean on the atmospheric thermopressure field is reflected most clearly in the lower part of the troposphere to the height of the 500-mb surface and above this level computation of the divergence of heat fluxes is very sensitive to errors in initial data. The terms of this equation were computed for 16 test areas in the North Atlantic formed by shipboard, island and on-shore stations and stations representing the centers of 10 deg squares to which all observational data available within the square are assigned. It is shown that the heat influxes due to macroscale atmospheric processes in the lower and middle troposphere, computed on the basis of climatic data for test areas with linear dimensions of about 1,000 km, are almost completely determined by the advection of apparent and latent heat. B.W.

N84-30483# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF CRUSTAL STRUCTURE OF EASTERN PACIFIC OCEAN ON ITS AGE Abstract only c46
P. N. Kuzmin and P. P. Shirshov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 46 refs Transl. into ENGLISH from Okeanol. (Moscow), vol. 24, no. 2, Mar. - Apr. 1984 p 295-301 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

The results of a study of the age dependence of seismic parameters of the crust for tectonically homogeneous structures in the eastern part of the Pacific Ocean (abyssal basins and conjugate sectors of the East Pacific Ocean Rise). Seismic parameters characterizing crustal structures include velocity of seismic waves at the surface of the acoustic basement, wave velocities in individual layers of the crust and at the top of the mantle, thicknesses of the second and third layers and averaged parameters - crustal thickness and mean velocity of waves in the crust. Four time zones are discriminated for the purpose of this study. There is a cyclicity in the change of averaged seismic parameters with age. The duration of a cycle is about 50 million years. The dependence of seismic parameters on age is compared with data on intraoceanic magmatism and data on continental tectogenesis. M.A.C.

N84-30484# Joint Publications Research Service, Arlington, Va.
STRUCTURE OF OCEAN FLOOR IN RELATION TO CONDITIONS FOR FORMATION OF LITHOSPHERE Abstract only c46
In its USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 47-48 refs Transl. into ENGLISH from Okeanol. (Moscow), vol. 24, no. 2, Mar. - Apr. 1984 p 302-307 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

A detailed study is made of 42 bathymetric profiles intersecting the mid oceanic ridges of the Atlantic and Pacific Oceans with allowance for data from continuous seismic profiling and also petrochemical and dynamic processes in the mantle. The profiles are those oriented perpendicularly to a rift, not passing through major transformed faults, seamounts and volcanic rises. A map of the axes of magnetic anomalies is used in determining the age of the lithosphere. The analysis revealed that mid-oceanic ridges can be classified on the basis of the position of phase transition points into three regions, and on the basis of the age of the second phase transition point into two types (normal and anomalous). The thickness of the oceanic lithosphere, computed theoretically, coincides with seismic data for the North Atlantic Ridge, South Atlantic Ridge, East Pacific Ocean Rise, South Pacific Ocean Rise, and possibly the western ridges of the Indian Ocean. M.A.C.

N84-30485# Joint Publications Research Service, Arlington, Va.
DEVELOPMENTS OF RESEARCH ON PREDICTION OF EARTHQUAKES, TSUNAMI AND VOLCANIC ERUPTIONS IN FAR EAST Abstract only c46
In its USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 62-63 refs Transl. into ENGLISH from Vestn. Akad. Nauk SSSR (Moscow), no. 2, Feb. 1984 p 3-9 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

The advances in research on prediction of earthquakes, tsunamis and volcanic eruptions in the Far East are discussed. A knowledge of the properties of the seismic cycle makes it possible to predict the probable number of weak and intermediate earthquakes. Prediction of the time of strong earthquakes is improved by the discovery of a dependence between the number of these earthquakes and the phase of the lunar tide with a period of 18.6 years. In the field of short range prediction a search for precursors is centered on study of the statistics of earthquakes, the patterns of distribution of their foci, earthquake spectra, deformations of the Earth's surface, anomalies of earth currents, discharge and chemical composition of ground water. Work on the search for precursors employs systems of telemetric seismic and tiltmeter stations, repeated geodetic measurements, measurements of the magnetic field and seismic probing. Some successes in short range prediction are evident. The tsunami danger is regionalized; it is taken into account in construction work on the Pacific coast. One of the most important problems in operation of the tsunami-warning system is the reduction of false alarms. M.A.C.

N84-30486# Joint Publications Research Service, Arlington, Va.
INTERPRETING THREE-DIMENSIONAL GRAVITATIONAL AND MAGNETIC ANOMALIES Abstract only c47
A. V. Tsirulskiy, V. I. Mayer, F. I. Nikonova, I. L. Prutkin, and N. V. Fedorova *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 65 refs Transl. into ENGLISH from Tikhookeanskaya Geol. (Novosibirsk) no. 1, Jan. - Feb. 1984 p 94-98 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

The interpretation of data from gravitational and magnetic prospecting can be broken down into two stages. The observed field is approximated by the field of some number of singular sources in the lower half plane. On the basis of some of the potential derivatives, stipulated in explicit form, it is necessary to find an equivalent family of solutions. This can be called the theoretical inverse problem. Specific objects must be selected from the equivalent families, taking the available geological information into account. The advantage of this approach is that there are no undesirable hypotheses concerning the properties of the sources. Simplified nonlinear equations are derived for the three dimensional theoretical problem in gravimetry and magnetometry. The results of application of the model are given. M.A.C.

N84-30487# Joint Publications Research Service, Arlington, Va.
CHANGES IN EARTH'S ROTATION RATE CAUSED BY ZONAL TIDE AND THEIR MANIFESTATIONS IN ATMOSPHERIC PRESSURE FIELD Abstract only c46
F. I. Rudyayev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 66 refs Transl. into ENGLISH from Izv. Vseoyuznogo Geograf. Obshcestva (Leningrad), v. 116, no. 2, Mar. - Apr. 1984 p 120-126 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

Atmospheric pressure changes associated with tidal changes in the Earth's rotation rate are examined in the example of the semiannual solar tide. The observed semiannual changes in atmospheric pressure at the Earth's surface both qualitatively and quantitatively are attributable to real changes in the Earth's rotation rate caused in turn by the semiannual solar tide. The semiannual atmospheric pressure changes are not tidal because they are not caused directly by the tide-generating force. The direct cause of the semiannual changes in atmospheric pressure is changes in the Earth's rate of rotation and therefore such atmospheric pressure changes are most correctly called rotational. This mechanism of semiannual changes in atmospheric pressure is applied to the entire spectrum of zonal long-period tides. Atmospheric pressure changes in the rhythms of long-period tides are a reflection of real tides in the Earth's hydrosphere and lithosphere. Author

N84-30488# Joint Publications Research Service, Arlington, Va.
QUASI-TWO-DAY VARIATION OF LOWER THERMOSPHERE WIND VELOCITIES Abstract only c46
O. V. Kaydalov, N. A. Makarov, and Yu. I. Portnyagin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 67 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 227-233 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

Data on the wind regime at altitudes 80 to 100 km reveal a regular oscillation in wind velocity variations with a period close to two days, the quasi-two-day variation. The results of these variations on the basis of a numerical model are given. Already published data are generalized and new data are analyzed. The comparison of the results of numerical modeling and experimental data indicated a satisfactory agreement beween the two. The seasonal variation of the amplitudes of wind velocities determined from the results of numerical modeling coincides completely with the seasonal variation detected experimentally. Due to the effect of Hall conductivity the viscosity and quasi-two-day variation is intensively destroyed in the lower thermosphere and its momentum and energy are imparted to the atmosphere. Since the seasonal variation of amplitudes of the quasi-two-day variation has a semiannual period, this variation is regarded as a source of energy and momentum in the lower thermosphere with the same period. Author

N84-30489# Joint Publications Research Service, Arlington, Va.
STABILITY CRITERION FOR MOIST COMPRESSIBLE ATMOSPHERE AND ENERGY CONDITIONS FOR DEVELOPMENT OF CONVECTIVE CLOUD COVER: NUMERICAL EXPERIMENT Abstract only c47
A. N. Vulfson *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 67-68 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 234-243 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

Assuming a background atmosphere that is conditionally stably stratified, the stability of a moist compressible atmosphere is studied. The stability of a moist static atmosphere was studied by Bjerknes. The stability of one dimensional stepped vertical movements of moist air id determined by the sign of the parameter VB. When $VB < 0$ there is instability, but when $VB > O$ disturbances have a stable character. The evolution of convective cloud cover is related to a change in the stability parameter VB so that the condition $VB < O$ corresponds to the stage of development of cloud cover, whereas under the condition $VB = O$ cloud cover attains the mature stage of its development. A generalization of the Bjerknes criterion is proposed. The stability parameter is computed and numerical experiments are described which simulate the development, mature phase and decay of a convective cloud. Adhering to the Bjerknes concept, the evolution of a convective cloud is examined from the point of view of stability theory. An energy interpretation is also proposed for interpretation of cloud development which is based on the law of energy conservation. B.G.

N84-30490# Joint Publications Research Service, Arlington, Va.
EFFECT OF ANTISCREENING OF OUTGOING THERMAL RADIATION BY CLOUD COVER Abstract only c47
I. I. Mokhov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 68-69 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), V. 20, no. 3, Mar. 1984 p 244-254 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

The response of radiation fluxes in the Earth's climatic system to a change in cloud cover are examined. The conditions for antiscreening of outgoing thermal radiation with a change in the quantity n of macroscale cloud cover are given. The effect of antiscreening of outgoing thermal radiation by cloud cover is manifested in a number of models and in empirical regressions. A further analysis of empirical data and models is required for confirmation of the climatic significance of this effects. In determining the total effect of antiscreening of outgoing thermal radiation by cloud cover all the climatic variables and parameters functionally related to cloud cover are varied, including the thermal structure, humidity field and position of cloud levels. In most cases of stratus clouds the vertical temperature gradient in the cloud layer is less than in the cloudless atmosphere. This favors the appearance of the full antiscreening effect. B.G.

N84-30491# Joint Publications Research Service, Arlington, Va.
ACCURACY OF ONE APPROXIMATE METHOD FOR COMPUTING RADIATIVE FLUXES IN PRESENCE OF BROKEN CLOUDS Abstract only c47
V. N. Skorinov and G. A. Titov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 70 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 263-270 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

By averaging the stochastic transfer equation in a set of cloud field observations, it is possible to arrive at equations for intensity moments of any degree in a Markov approximation. An algorithm was written for computing mean intensity by the Monte Carlo method. An asymptotic form of the mean intensity equations is obtained for a case when the horizontal extent of the clouds is much greater than their vertical extent. The relative error in computing the mean radiative fluxes by the Monte Carlo method does not exceed 2% to 3%. The mean intensity equations in the proposed Markov approximation are equivalent to the mean radiative fluxes in the "open-closed" approximation. This approximation describes well the transfer of radiation in broken clouds consisting of stratiform forms whose horizontal dimensions are approximately 10 km or more but is inapplicable for solution of the problem of transfer of optical radiation when cumulus clouds are present, except when the extinction coefficient is small. Author

N84-30492# Joint Publications Research Service, Arlington, Va.
SMALL-ANGLE METHOD IN STUDY OF SINGLE AND MULTIPLE SCATTERING Abstract only c32
V. F. Belov, A. G. Borovoy, N. I. Vagin, and S. N. Volkov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 71-72 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 323-327 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

A simple analytical expression is derived for solution of the radiation transfer equation, expressed through the optical thickness and the autocorrelation function of the shadow from an individual particle. In this case, the finding of the ray intensity is reduced to numerical computation of a one-dimensional integral. The results of such computations with an electronic computer are presented. It is shown that the expressions for single scattering are naturally included in the derived multiple scattering expressions and the small angle method can be used successfully in the case of multiple scattering as well. The application of the results to solution of inverse problems by the small angle method is discussed, as well as the limits of applicability of the small-angle radiation transfer problem approximation. Author

N84-30493# Joint Publications Research Service, Arlington, Va.
RESONANCE ABSORPTION OF NARROW-BAND LASER RADIATION BY ATMOSPHERIC GASES Abstract only c36
A. A. Mitsel, Yu. N. Ponomarev, and K. M. Firsov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 72 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 327-329 Document also announced as A84-30422 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

The transmission function for the case of the resonance interaction of narrow-band laser radiation is given, along with the relation for the optical thickness. Reference is made to a study by Makushkin, et al. (1983), which showed that the error in calculating the transmission function for an inhomogeneous past arising from inaccuracies in the spectroscopic and meteorological data amounts to 10 percent. For this reason, it is contended that certain simplifications can be made in the transmission function and the relation for the optical thickness. In this way, simple analytical expressions can be obtained whose deviation from rigorous machine computations will be no greater than errors contained in the initial data. C.R. (IAA)

N84-30494# Joint Publications Research Service, Arlington, Va.
INTERPRETING SPECTRA OF SEA SURFACE AERIAL PHOTOGRAPHS Abstract only c43
A. G. Luchinin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 73 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 331-334 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

The image of the sea surface formed in the visible spectral range includes information on surface waves; the spatial spectrum of aerial photographs of the surface corresponds to the spectrum of wave slopes. Modulation of brightness of the sea surface by waves can be caused by different physical factors. The influence of angular nonuniformity of sea surface illumination and the dual focusing phenomenon arising with the double transmission of light through the wave-covered air-water interface was studied. It is shown that the contribution of the dual focusing effect is important in an extremely wide range of spatial scales. It is possible to characterize the spectral dependence of the relative contribution of the dual focusing effect to the formation of brightness fluctuations more completely by introducing the parameter $a^* = \max a(k)$ and the spatial frequency k^* showing at what spatial scales a maximum of the function a(k) is formed. These parameters are computed as a function of optical wavelength. The contribution of the dual focusing effect is most conspicuous in the region of wavelengths lambda approximately 500 nm. This effect exerts an influence not only in the magnitude of the fluctuations, but also on their angular spectrum. Author

N84-30495# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
REPORTS ON CARTOGRAPHY AND GEODESY. SERIES 1: ORIGINAL REPORTS, NUMBER 92 [NACHRICHTEN AUS DEM KARTEN- UND VERMESSUNGSWESEN. REIHE 1: ORIGINALBEITRAEGE, HEFT NO. 92]
1983 191 p refs Partly in GERMAN and ENGLISH Original contains color illustrations
(ISSN-0469-4236) Avail: NTIS HC A09/MF A01

Mine survey, computer aided mapping, cartographic customer service, and a combined edge program are considered. Forestry conjunction of aerial photography and maps, synthesized color printing, automatic digitization of cartographic linedrawings are included. Regional planning instruments, data interconnection between the automated cadastral plan and topographic cartography, and a cartographic pattern recognition system are described. For individual titles, see N84-30496 through N84-30509.

N84-30496# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
DIGMAP, AN INTERACTIVE GRAPHIC SUPPORT SYSTEM FOR MINE SURVEY [DIGMAP, EIN INTERAKTIVES GRAPHISCHES SYSTEM ZUR UNTERSTUETZUNG MARKSCHEIDERISCHER ARBEITEN] c43
Rudolph Dann *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 7-10 In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

An interactive graphic system for deposit processing is described. The deposit is represented as a three dimensional model of seams and faults. Rapid updating of horizontal projection and sections is pointed out. Author (ESA)

N84-30497# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

AUTOMATIC SYMBOL GENERATING FOR TOPOGRAPHIC MAPS USING RASTER DATA PROCESSING FOLLOWING THE EXAMPLE OF THE GENERAL TOPOGRAPHIC MAP 1:200, 000 (TUEK 200) [AUTOMATISCHE SYSBOLERZEUGUNG FUER FOPOGRAPHISCHE KARTEN DURCH DIGITALE RASTERDATENVERARBEITUNG AM BEISPIEL DER TOPOGRAPHISCHEN UEBERSICHTSKARTE 1:200,000 (TUEK 200)] c43

Matthias Giebels *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 11-25 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

Automatic generation of cartographic symbols by use of digital raster data processing is described. Definition, storage, and positioning of symbols were established. Differences as to the practical application of these procedural stages for point, line, and aerial symbols are emphasized. Point and aerial symbols are defined directly, whereas line symbols are defined by a special descriptive symbol language, point and line symbols are positioned via vector definition of position, and aerial symbols by means of masks in raster format. Economical generation and high graphic quality are pointed out. Author (ESA)

N84-30498# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

APPLICATION OF FASTRAK BY SKANDINAVISK AUTO-DIGITALISERINGS AB (SADAB) CARTOGRAPHIC SERVICE [ANWENDUNG VON FASTRAK BEI SADAB KARTOGRAPHISCHES SERVICEBUERO] c43

Peter W. Hilton *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 27-33 In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

A cartographic customer service based on the FASTRAK automatic line following digitizers is presented. The equipment comprises two laser-scan FASTRAK systems connected to a PDP 11/60 minicomputer. Topographic, utilities, city, and polygon map digitizing is proposed. A throughput increase of 10 times that of a manual system for digitizing, interactive editing, and production of microfiche check plots is pointed out. Author (ESA)

N84-30499# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

COMEDG: A PROGRAM TO COMBINE LOGICALLY INDEPENDENT LINE SEGMENTS INTO GEOMETRICALLY COHERENT LINES c61

Jiang Jing-tong (Academia Sinica, Chengdu, China) *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 35-54 (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

A Combine Edges (COMEDG) FORTRAN program is discussed. It can recognize and combine very close edges using the logical data base interface (LDBI) of Contraves interactive program system (CIPS) at a higher speed than that of interactive methods. Purpose, utility, programming principles, and main structure of the program are explained. Recognition, arrangement in real geometric sequence, adjustment of string directions, and combination are illustrated. Author (ESA)

N84-30500# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

AUTOMATION ASSISTED GATHERING, PROCESSING, AND REPRESENTATION OF TOPOGRAPHIC DATA FOR THE PRODUCTION OF THE GERMAN BASIC MAP 1:5000 - HEIGHT IN LOWER SAXONY [AUTOMATIONSGESTUETZTES ERFASSEN, VERARBEITEN UND DARSTELLEN TOPOGRAPHISCHER DATEN FUER DIE HERSTELLUNG DER DEUTSCHEN GRUNDKARTE 1:5000-HOEHE IN NIEDERSACHSEN] c61

Erwin Kophstahl *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 55-59 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

Single point digital height evaluations for the production of the German basic map 1:5000 are covered. Lower lying areas of the Geest and coastal regions of lower Saxony were processed with an automation assisted topographical system (TOPSY) to produce an automatic contour line draft. Height data are stored in a permanent access data base to establish a height information system with complete area coverage. Planimetric data are not stored. Approximately 450 sheets were processed with an average of 150 sheets per year. The HP 21 MX and Siemens 7536 computers were used for data gathering and remote transmission. Gathering accuracy is 1 to 2 dm. Author (ESA)

N84-30501# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

FOREST GENERALIZATION BY DIGITAL RASTER DATA PROCESSING [WALDGENERALISIERUNG DURCH DIGITALE RASTERDATENVERARBEITUNG] c43

Hans-Guenter Lay and Wigand Weber *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 61-71 refs IN GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

Cartographic generalization of forests is treated. Foils with forest masks were scanned. Starting from an interactively set point, the background around the wooded areas was colored automatically to distinguish it from the clearings. Woods and clearings were combined in series of blow and shrink operations and separately simplified simultaneously. Woods and clearings are selected according to an area criterion. Another application of the procedure is the change of scale from 1:500,000 to 1:1 million; it requires little time. Author (ESA)

N84-30502# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

COOPERATIVE LINE EXTRACTION OF AERIAL PHOTOS AND MAPS [KOOPERATIVE LINIENEXTRAKTION AUS LUFTBILD UND KARTE] c43

Reinhard Lubkowitz *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 73-82 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

Conjunction of aerial photography and maps of the same imaged area is studied. For test purposes extracts from the various printing foils of the topographical map 1:50,000 were processed in conjunction with aerial photographs of the same area. Manuscripts corresponding to the printing foils can be produced artificially by first scanning the whole map with red, green, and blue light and then combining the resultant color scans. It is found that cooperative line extraction of two images gives higher efficiency. Correctness and completeness of the extraction results obtained from one manuscript can be checked by comparison with another one. Author (ESA)

N84-30503# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

SOFTWARE RESEARCH FOR COMPUTER AIDED CARTOGRAPHY AT THE BERLIN TECHNICAL UNIVERSITY [SOFTWARE-ENTWICKLUNG ZUR RECHNERGESTUETZTEN KARTOGRAPHIE AN DER TECHNISCHE UNIVERSITAET BERLIN] c61

Alfred Mehlbreuer and Gerhard Koenig *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 83-93 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)

Avail: NTIS HC A09/MF A01

Three software research program systems for computer aided cartography are presented. Calculation and drafting of map projections, computer assisted compilation of thematic maps, and digital image processing are discussed. Author (ESA)

N84-30504# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AN EXAMPLE OF COMPUTER AIDED GENERALIZATION OF TK 25 [EIN BEISPIEL RECHNERGESTUETZTER GENERALISIERUNG FUER DIE TK 25] c61
Kurt Menke *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 95-108 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

A complex generalization mapping test is reported. Two programs for computer aided generalization of partial contents of the German basic map 1:5,000 (DGK 5) for the topographical map 1:25,000 (TK 25) were used on four adjoining sheets of the DGK 5 map. Simplification, combination, and typification of buildings as well as widening and narrowing or emphasizing particularly wide places in transport routes were included. Results show that the generalization steps "displacement of buildings" and "simplification of transport routes" in particular cannot be dispensed with for the change of scale. Author (ESA)

N84-30505# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AN INVESTIGATION OF THE REPRODUCTION OF THE GENERAL TOPOGRAPHIC MAP 1:200,000 IN SHORTENED SCALE WITH A DIGITAL RASTER DATA PROCESSING SYSTEM [ERFAHRUNGEN BEI DER REPRODUKTION DER TOPOGRAPHISCHEN UEBERSICHTSKARTE 1:200,000 IN VERKUERZTER SKALA MIT EINEM DIGITALEN RASTERDATENVERARBEITUNGSSYSTEM] c43
Heinz Meurisch and Wigand Weber *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1984 p 109-141 refs In GERMAN; ENGLISH summary Original contains color illustrations (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

Synthesized color printing for topographic maps using digital raster techniques is described. Digitization and digital rectification of original overlays, automatic generation of each screened printing overlay of a base printing color on a raster plotter in one common operation, and formation of each screen dot, according to the building block method, from elementary points of a laser light source were performed. Discrete values for screen width and angle and free allocation of the printing color tones to the gray gradations of a halftone original (e.g., hill shading) are the other characteristics. A reduction was obtained from 10 printing colors of real color printing to only 5 of synthesized color printing. The scanner and plotter resolution was chosen to equal 32 points/mm. Methods to obtain a higher cost effectiveness are proposed. Author (ESA)

N84-30506# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
A SYSTEM FOR AUTOMATIC DIGITIZATION OF CARTOGRAPHIC LINE DRAWINGS [EIN NEUES SYSTEM ZUR AUTOMATISCHEN DIGITALISIERUNG KARTOGRAPHISCHER STRICHZEICHNUNGEN] c61
Ivar Nackunstz *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 143-155 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

A scanning device for processing two dimensional geometric data is presented. It consists of a video camera connected to a digital image memory. The scanning of the whole image with maximum resolution is not necessary since a computer controlled zoom lens adapts scanning resolution to the local structure of the image. Large images can be processed by moving the camera stepwise over the map. By using local adaptive methods for pattern recognition most of the digitizing process can be done automatically even if the line drawing is of low graphical quality. Author (ESA)

N84-30507# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
RASTER PROCESSING FOR REGIONAL PLANNING TASKS [RASTERVERARBEITUNG FUER DIE AUFGABENSTELLUNG RAUMBEZOGENER PLANUNG] c43
Wolfgang Ophoff *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 157-165 In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

Regional planning by means of data processing instruments is considered. The procedure requires that the various data be gathered (preferably from thematic maps) and condensed, with the aid of a uniform grid and corresponding processing functions, to a form suitable for planning purposes. It is concluded that automatic maps satisfy cartographic accuracy and optical information capacity requirements. Author (ESA)

N84-30508# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
THE AUTOMATED CADASTRAL PLAN, A SOURCE FOR THE TOPOGRAPHIC COUNTRY MAP WORKS [DIE AUTOMATISIERTE LIEGENSCHAFTSKARTE (ALK), EINE QUELLE FUER DIE TOPOGRAPHISCHEN LANDESKARTENWERKE] c43
Wilfried Staufenbiel *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 167-175 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

The principles of data interconnection between the property cadastre - automated cadastral plan - and topographic cartography are described. Revision of the property cadastre catalog on the nature of use, planned updating of the uses recorded, as well as to the feature code catalog as the first practical steps towards a data interconnection system is discussed. Author (ESA)

N84-30509# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
SUGGESTION FOR A CARTOGRAPHIC PATTERN RECOGNITION SYSTEM USING DIGITAL RASTER DATA PROCESSING METHODS [FORSCHLAG FUER EIN SYSTEM ZUR KARTOGRAPHISCHEN MUSTERERKENNUNG NACH METHODEN DER DIGITALEN RASTERDATENVERARBEITUNG] c43
Wigand Weber *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 177-189 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

A programming system for cartographic pattern recognition is specified. Features of geometric shape and of topology (i.e., deterministic and structural and not stochastic ones) relating to portions of symbols, to whole symbols, and to symbol relationships were used. Symbol classification was carried out on the basis of these features according to the principle of multivariant classification in an n-dimensional feature space following the parallel piped procedure. Parallel algorithms of digital image processing, batch, and interactive working methods were used. The modulus of the programming system can be used as words of a cartographic pattern recognition language, following, among others, the decision tree procedure. Author (ESA)

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N84-30510*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE EFFECT OF SPATIAL, SPECTRAL AND RADIOMETRIC FACTORS ON CLASSIFICATION ACCURACY USING THEMATIC MAPPER DATA

R. Wrigley, W. Acevedo (Technicolor Government Services, Inc.), D. Alexander (Technicolor Government Services, Inc.), J. Buis (Technicolor Government Services, Inc.), and D. Card Jul. 1984 11 p refs
(NASA-TM-85995; A-9836; NAS 1.15:85995) Avail: NTIS HC A02/MF A01 CSCL 08B

An experiment of a factorial design was conducted to test the effects on classification accuracy of land cover types due to the improved spatial, spectral and radiometric characteristics of the Thematic Mapper (TM) in comparison to the Multispectral Scanner (MSS). High altitude aircraft scanner data from the Airborne Thematic Mapper instrument was acquired over central California in August, 1983 and used to simulate Thematic Mapper data as well as all combinations of the three characteristics for eight data sets in all. Results for the training sites (field center pixels) showed better classification accuracies for MSS spatial resolution, TM spectral bands and TM radiometry in order of importance.
Author

N84-30511*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

DATA INTEGRITY FACTORS AFFECTING THE CONSTRUCTION OF THE MAPPING, CHARTING, AND GEODESY DATA BASE Final Technical Report

S. Z. Friedman 1 Jul. 1983 40 p refs Sponsored by NASA
(NASA-CR-173835; JPL-D-879; NAS 1.26:173835; AD-A142388; ETL-0357) Avail: NTIS HC A03/MF A01 CSCL 08B

Numerous data integrity problems are encountered while processing the digitized map data used for the research task, an image based approach to Mapping, Charting, and Geodesy (JPL Task No. RD-182, Amendment 125). Those problems were not fully addressed within an earlier document (JPL Internal Document 715-153, 1982) describing the Mapping, Charting, and Geodesy (MC&G) project. Increased interest in those problems has prompted the completion of this separate report. In this document, specific data integrity problems are analyzed and methods for their solution are described. Although many of the problems described herein are project specific, this document contains information which could be useful to data with building large cartographic data bases. GRA

N84-30512# SACLANT ASW Research Center, La Spezia (Italy).

A DIRECTORY OF EUROPEAN, MIDDLE EASTERN, AND NORTH AFRICAN COASTAL GROUND CONTROL POINTS FOR MAPPING SATELLITE IMAGES

B. Wannamaker and E. Nacini 15 Mar. 1984 73 p
(AD-A142019; SACLANTCEN-SM-170) Avail: NTIS HC A04/MF A01 CSCL 08/2

Environmental data collected by satellite are now in extensive use. If the altitude and position of data-measuring satellites are accurately known, the measured data may be mapped automatically. Otherwise, as is usual, mapping on a standard projection may be achieved by using ground control points. For plotting oceanographic data from the eastern North Atlantic and the Mediterranean, SACLANTCEN has used the 392 European, Middle Eastern, and North African coastal ground control points whose positions and altitudes are listed in this document. GRA

N84-30513# Ben Gurion Univ. of the Negev, Sede Boqer (Israel). Inst. for Desert Research.

DESERT EMERGENCY - LACK OF WATER - HOW TO FIND AND COLLECT WATER. PLANTS AND HUMAN SURVIVAL IN THE DESERT Interim Report, Nov. 1983 - Feb. 1984

Y. Gutterman 10 Dec. 1983 4 p
(Contract DAJA45-83-C-0051; DA Proj. 1T1-61102-BH-57)
(AD-A142025; IR-1) Avail: NTIS HC A02/MF A01 CSCL 06/3

It is possible to relate anatomic and morphologic traits of the plants with the water condition of the roots, thus making it possible to select those plants having the highest potential water yield. It has been determined that enclosing a branch consisting of living foliage in an impermeable membrane, such as a plastic sack, results in heat stress which inhibits transpiration. Alternative methods of collecting transpiration water are being sought. Preliminary evidence suggests that the rates of transpiration are not uniform on all sides of a plant. Author (GRA)

N84-30514# Environmental Research Inst. of Michigan, Ann Arbor. Radar Div.

A DESCRIPTION OF THE MIZEX 1984 REMOTE SENSING ACTIVITIES

May 1984 40 p
(Contract N00014-82-C-0663)
(AD-A142296; AD-E750179; ERIM-163500-4-T) Avail: NTIS HC A03/MF A01 CSCL 17/9

The remote sensing program for MIZEX 84 will involve the coordinated efforts of both ice and ocean scientists using microwave, infrared, and visual remote sensors to investigate MIZ phenomena. Operating from surface, helicopter, ship, aircraft, and satellite platforms, these sensors should provide information on all scales of MIZ processes. This experiment plan sets forth the scientific and operational objectives of these remote sensing efforts and summarizes the individual measurement plans. Author (GRA)

N84-30515# Envirosphere Co., Atlanta, Ga.

DELINEATION OF WETLAND BOUNDARIES USING VEGETATION WITHIN THE ALTAMAHA RIVER BASIN OF GEORGIA Final Report

B. F. Vaughn, Jr., R. J. Cooper, J. H. Brashwell, and R. Hart Apr. 1984 75 p
(Contract DACW39-78-C-0092)
(AD-A142590; WES/TR/Y-84-1) Avail: NTIS HC A04/MF A01 CSCL 08/8

This study develops a sound quantitative method for the assessment of the structure, location, and composition of transition zones adjacent to wetland communities in the Altamaha River Basin of Georgia. The resulting methods will be incorporated into a U.S. Army Corps of Engineers methodology for delineating wetlands. Six sampling methods, three similarity indices, and four analytical strategies were investigated. Phase 1 of the study consisted of evaluation of sampling and analytical methods and selection of the best method. The best method proved to be the use of (1) 1- x 4-m contiguous quadrats for sampling along transects parallel to the moisture gradient and (2) Jaccard's community coefficients for data analysis. Phase 2 of the study consisted of further evaluation of the best method. This method was found to be advantageous because: (1) It does not rely on the use of indicator species; plant association are used instead. (2) It is uncomplicated, technically reproducible, and therefore amenable to the legal interpretation in defining wetland boundaries. (3) The procedures are well documented in the literature. (4) It is applicable to a variety of physiognomic types. (5) Minimal training is required for proper application of the method by field personnel.
Author (GRA)

N84-30516# Woodard-Clyde Consultants, San Francisco, Calif.

SEISMICITY OF THE PARADOX BASIN AND THE COLORADO PLATEAU INTERIOR

Ivan G. Wong Apr. 1984 138 p refs
(Contract DE-AC02-83CH-10140)
(DE84-011620; BMI/ONWI-492) Avail: NTIS HC A07/MF A01

National Waste Terminal Storage Program site qualification criteria require that a nuclear waste repository be located so that ground motion associated with the maximum credible and maximum probable earthquakes or other earthquake-associated effects will not have an unacceptable adverse impact on system performance. To determine whether a potential repository site located in the Paradox salt formation in the Paradox Basin of southeastern Utah satisfies these criteria, seismological studies were undertaken by Woodward-Clyde Consultants (WCC) in March 1978. These studies included: (1) analysis of historical seismicity; (2) analysis of contemporary seismicity and tectonics of both the Paradox Basin and surrounding Colorado Plateau, including an extensive program of microearthquake monitoring; (3) evaluation of the Paradox Basin crustal structure; (4) evaluation of mining-induced seismicity; and (5) characterization of design-related earthquake-induced ground motions pertinent to a potential repository site through studies of attenuation and subsurface ground motions. A detailed discussion of the results of the seismological studies performed through December 1980 is contained in WCC (1982). The purpose of this topical report is to update and summarize the studies on the local, regional, and mining-induced seismicity conducted through December 1982. DOE

N84-30517# Idaho Univ., Moscow. Dept. of Geology.
THERMAL GROUND WATER FLOW SYSTEMS IN THE THRUST ZONE IN SOUTHEASTERN IDAHO
Dale R. Ralston May 1983 365 p refs
(Contract DE-AS07-77ET-28407)
(DE84-011598; DOE/ET-28407/4) Avail: NTIS HC A16/MF A01

Thermal and nonthermal ground water flow systems in the thrust zone of southern Idaho and western Wyoming were studied. The study involved hydrogeologic and hydrochemical data collection and interpretation. The role of thrust zones in controlling the movement of thermal and nonthermal fluids is analyzed. DOE

N84-30518# Nebraska Univ., Lincoln.
INVENTORY OF GEOTHERMAL RESOURCES IN NEBRASKA Final Report
William D. Gosnold and Duane A. Eversoll 30 Jun. 1983 346 p
(Contract DE-AS07-79ET-27205)
(DE84-009679; DOE/ET-27205/T1) Avail: NTIS HC A15/MF A01

The goal of the State Coupled Resource Assessment Program is to identify and evaluate geothermal resources in the state, particularly low-temperature potential. Eight tasks were identified and documented in this report as follows: bottom-hole temperature survey, heat flow and temperature gradient survey, data translation studies, gravity data, substate regions, information dissemination, state geothermal map, and reports. The project had three major products: (1) a map, Geothermal Resources of Nebraska; (2) a significant amount of thermal data collected and documented within the state; and (3) a series of publications, presentations and meetings (documented as an Appendix). DOE

N84-30519# Washington State Dept. of Natural Resources, Olympia. Div. of Geology and Earth Resources.
TARGETING GEOTHERMAL EXPLORATION SITES IN THE MOUNT ST. HELENS AREA USING SOLID MERCURY SURVEYS
Jenny Holmes and Kathleen Waugh Nov. 1983 35 p refs
(Contract DE-AC07-79ET-27014)
(DE84-012547; DOE/ET-27014/T17) Avail: NTIS HC A03/MF A01

The background mercury level was determined for the areas studied, providing preliminary information for future work. Identification of areas which might merit more intensive sampling was also accomplished. The clusters of samples with high Hg concentrations in both areas may indicate high heat flow and require further investigation. Problems involving the use of this method in the Cascades were also identified. Both areas north and south of the mountain had approximately the same standard deviation (expressed as a percentage of the mean), even though the sampling horizons seemed much more consistent and less disturbed in the Marble Mountain area than in the Green River Soda Springs area. This may indicate that for these areas, secondary controls are more important, or that Hg anomalies are much smaller than indicated in studies of other areas. DOE

N84-30520# Office of Technology Assessment, Washington, D.C.
REMOTE SENSING AND THE PRIVATE SECTOR: ISSUES FOR DISCUSSION
Mar. 1984 149 p
(PB84-160777; OTA-TM-ISC-20) Avail: NTIS HC A07/MF A01 CSCL 05D

The process of early transfer from the Federal Government to the private sector of the Land Remote Sensing Satellite (LANDSAT) system for the remote sensing from space is considered. This raises the issues of whether to carry out the transfer and how to carry it out. This memorandum indirectly addresses the question of whether the transfer is in the public interest by focusing on one aspect of such a transfer: the public benefits provided by the government's civilian meteorological and land remote sensing systems. It analyzes the effects that transfer of these systems to the private sector might have on the provision of these public benefits. Principal reasons for transferring remote sensing services to private bands are the private excels both at innovation and at developing markets; the hope of reducing federal expenditures. OTA has found that the private owner/operator may require large federal subsidy. GRA

N84-30521# Geological Survey, Boston, Mass. Water Resources Div.
WATER RESOURCES DATA FOR MASSACHUSETTS AND RHODE ISLAND, WATER YEAR 1982
R. A. Gadoury, G. G. Girouard, and D. F. Letty Jan. 1984 245 p
Sponsored in part by the States of Massachusetts and Rhode Island and other agencies
(PB84-180009; USGS/WRD/HD-84/013; USGS/WDR/MA-RI-82-1) Avail: NTIS HC A11/MF A01 CSCL 08H

Water resources data for the 1982 water year for Massachusetts and Rhode Island consist of records of stage, discharge, and water quality of streams, contents of lakes and reservoirs and ground water levels. This report contains discharge records for 97 gaging stations, monthend contents for 30 lakes and reservoirs, water quality for 10 gaging stations, and water levels for 107 observation wells. Also included are data for 3 low flow and 18 crest stage partial record stations. Author (GRA)

N84-30522# Geological Survey, Little Rock, Ark. Water Resources Div.
WATER RESOURCES DATA FOR ARKANSAS, WATER YEAR 1982 Annual Water-Data Report, 1 Oct. 1981 - 30 Sep. 1982
T. E. Lamb, J. E. Porter, B. F. Lambert, and J. Edds 1983 513 p
(PB84-181296; USGS/WRD/HD-83/010; USGS/WDR/AR-82-1) Avail: NTIS HC A22/MF A01 CSCL 08H

Water resources data for the 1982 water year for Arkansas consist of records of gage height, discharge and water quality of streams; elevation, contents, and water quality of lakes; water levels and water quality of observation wells. This report contains discharge records for 55 gaging stations; water quality for 149 stations, 47 partial-record stations, 25 observation wells; and water levels for 95 observation wells. Also included are data for 99 crest-stage partial-record stations. Author (GRA)

N84-30523# Geological Survey, Tuscaloosa, Ala. Water Resources Div.
WATER RESOURCES DATA FOR ALABAMA, WATER YEAR 1982 Annual Water-Data Report, 1 Oct. 1981 - 30 Sep. 1982
H. C. Rollins, F. C. Sedberry, E. G. Ming, and I. A. Giles Oct. 1983 481 p
(PB84-183250; USGS/WRD/HD-84-008; USGS-WRD-AL-82) Avail: NTIS HC A21/MF A01 CSCL 08H

Water resources data for the 1982 water year for Alabama consisting of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels in wells are presented. Discharge records for 85 gaging stations, stage only for 16 gaging stations, stage and contents for 12 lakes and reservoirs, water quality for 67 gaging stations and 76 wells, and water levels for 52 observation wells are given. Also included are 10 crest-stage partial-record stations and 8 flood hydrograph partial-record stations. Additional water data were collected at various sites not part of the systematic data collection program, and are displayed as miscellaneous measurements and analyses. Author (GRA)

N84-30524# Johns Hopkins Univ., Shadyside, Md. Chesapeake Bay Inst.
CHESAPEAKE BAY NUTRIENT DYNAMICS STUDY
Jay L. Taft May 1984 308 p refs
(Grant EPA-R-807637)

(PB84-190982; EPA-600/3-83-072) Avail: NTIS HC A14/MF A01 CSCL 08H

This study had two major objectives. The first was to fill gaps in the understanding of important biological, chemical, and physical processes occurring in the Bay. The second objective was to collect a synoptic data set for the entire Chesapeake Bay to be used in future modeling efforts and to establish the present condition of the main Bay at one point in time. The process studies were performed at various times and locations dictated by the processes themselves. Subsurface transport of nutrients and phytoplankton were examined in May 1980 in the upper Bay. Sediment nutrient releases and oxygen demand were studied in eight locations in summer 1980 and spring 1981. Nitrogen and silica dynamics were examined in several locations during July, August, and September 1980. Bacterial dynamics were studied in August 1980. GRA

N84-30525# Cranbrook Inst. of Science, Bloomfield Hills, Mich.
PARTITIONING OF TOXIC TRACE METALS BETWEEN SOLID AND LIQUID PHASES IN THE GREAT LAKES
Kenneth R. Rygwelski Apr. 1984 26 p refs
(Grant EPA-R-804442)
(PB84-177849; EPA-600/D-84-098) Avail: NTIS HC A03/MF A01 CSCL 08H

The interaction between particulate matter and trace metal species in the water column plays an important role in metals transport and fate throughout the Great Lakes environment. Where there is strong sorption of a metal by particulates and settling is involved, the metal should not be regarded as a conservative substance in the water column. Dolan and Bierman (1982) modeled the transport of trace metals in Saginaw Bay, Lake Huron, and found that a large percentage of the cadmium, lead and zinc were lost to the sediment via metal association with particulates suspended in water. Enrichment of cadmium, lead, zinc and copper was found in surface sediments of Kales Superior and Huron by Kemp et al. (1978) and of Lakes Ontario and Erie by Kemp and Thomas (1976). Dredging operations and water turbulence can resuspend these particulates and sorbed metals may be subsequently released again to the water column. Author (GRA)

N84-30526# Idaho Univ., Moscow. Dept. of Civil Engineering.
IN-STREAM DISTRIBUTION AND HYDRAULIC AND ECOLOGICAL EFFECTS OF VOLCANIC ASH FROM MOUNT ST. HELENS ERUPTION
James M. Milligan, C. Michael Falter, and Merlyn A. Brusven Oct. 1983 142 p refs
(Contract DI-14-34-0001-1466)
(PB84-169382; OWRT-C-10105-V(1466)(1)) Avail: NTIS HC A07/MF A01 CSCL 08H

The catastrophic eruption of Mt. St. Helens in southwestern Washington on May 18, 1980 deposited a plume of volcanic ash from Washington to western Montana. Ash deposits in northern Idaho were significant with depths varying from 2 to 3 mm in the fringes to as much as 50 mm in the central area of the plume as it crossed the Idaho panhandle. Varying amounts of the ash were deposited directly in streams located in the plume area. This study is an evaluation of the changes in the in-stream ecological conditions resulting from volcanic ash deposition and transport. The results obtained from the simulation and field studies clearly indicate catastrophic influences of volcanic ash deposition and transport on attached benthic algae biomass and on the dislocation of invertebrates and interruption of food-chain relationships. Author (GRA)

N84-30527# Arizona Water Resources Research Center, Tucson.
ESTIMATION OF RECHARGE IN A SMALL SOUTHERN ARIZONA BASIN BY MEANS OF HYDROLOGICAL, HYDROCHEMICAL, AND ENVIRONMENTAL ISOTOPE DATA
Shlomo P. Neuman and Eilon Adar Dec. 1983 143 p refs
(Contract DI-14-34-0001-1103)
(PB84-159672; OWRT-A-099-ARIZ(1)) Avail: NTIS HC A07/MF A01 CSCL 08H

A mathematical model is proposed to estimate the ratios between various components of recharge into an alluvial aquifer system. The model is similar in principle to one developed earlier by Woolhiser, et al. (1982) the river channels. It is based on long-term average mass balance expressions applied to water and various dissolved chemical constituents, coupled with a quadratic programming optimization scheme. The suitability of this model to the semiarid Aravaipa basin in southern Arizona is explored. Potential components of recharge into the basin are identified qualitatively on the basis of hydro-geological, hydrological, hydrochemical, and hydroisotope data. A method to obtain quantitative estimates of these components is outlined. Actual application of the quantitative model to the Aravaipa basin will be the subject of a future report. Author (GRA)

N84-30360*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE LANDSAT-4 PROGRAM: AN OVERVIEW
William Webb *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 1-14 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05A

N84-30361*# General Electric Co., Philadelphia, Pa.
LANDSAT-4 SYSTEM DESCRIPTION
Theodore C. Aepli *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 15-30 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 22B

N84-30362*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MULTISPECTRAL SCANNER (MSS) INSTRUMENT DESCRIPTION
John L. Barker and Gary Banks *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 31-40 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

N84-30363*# Santa Barbara Research Center, Goleta, Calif.
THEMATIC MAPPER (TM) INSTRUMENT DESCRIPTION
Jack Engel *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 41-61 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 14B

N84-30364*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN OVERVIEW OF LANDSAT-4 AND THE THEMATIC MAPPER
James R. Irons *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 62-64 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

N84-30365*# Santa Barbara Research Center, Goleta, Calif.
THEMATIC MAPPER SENSOR CHARACTERISTICS
Jack Engel *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 65-89 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

N84-30366*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RADIOMETRIC CALIBRATION AND PROCESSING PROCEDURE FOR REFLECTIVE BANDS ON LANDSAT-4 PROTOFLIGHT THEMATIC MAPPER
John L. Barker, R. B. Abrams (Computer Sciences Corp., Silver Spring, Md.), D. L. Ball (Computer Sciences Corp., Silver Spring, Md.), and K. C. Leung (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983

Workshop Results, Vol. 1 Jul. 1984 p 90-91 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

N84-30367*# General Electric Co., Philadelphia, Pa.
AN OVERVIEW OF THE THEMATIC MAPPER GEOMETRIC CORRECTION SYSTEM
Eric P. Beyer *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 92-100 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

N84-30368*# General Electric Co., Lanham, Md. Space Div.
THEMATIC MAPPER IMAGE PROCESSING SYSTEM (TIPS) PROCESSING STATUS
Joan Brooks *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 101-105 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

N84-30369*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THEMATIC MAPPER IMAGE PRODUCTION IN THE ENGINEERING CHECKOUT PHASE
David Fischel and John C. Lyon (Systems and Applied Sciences Corp., Hyattsville, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 106-107 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 08B

N84-30370*# International Business Machines Corp., Palo Alto, Calif. Scientific Center.
LANDSAT-4 RADIOMETRIC AND GEOMETRIC CORRECTION AND IMAGE ENHANCEMENT RESULTS
Ralph Bernstein and Jeffrey B. Lotspiech *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 108-115 ref ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

N84-30371*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TM DIGITAL IMAGE PRODUCTS FOR APPLICATIONS
John L. Barker, Fred J. Gunther (Computer Sciences Corp., Silver Spring, Md.), Rochelle B. Abrams (Computer Sciences Corp., Silver Spring, Md.), and Dave L. Ball (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 116-126 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

N84-30372*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPECTRAL CHARACTERIZATION OF THE LANDSAT THEMATIC MAPPER SENSORS
Brian L. Markham and John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 127-129 Previously announced as N84-15634 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

N84-30376*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THERMAL BAND CHARACTERIZATION OF LANDSAT-4 THEMATIC MAPPER
Jack C. Lansing (Santa Barbara Research Center, Goleta, Calif.) and John L. Barker *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 186-188 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

N84-30381*# Purdue Univ., Lafayette, Ind.
LANDSAT-4 MSS AND TM SPECTRAL CLASS COMPARISON AND COHERENT NOISE ANALYSIS
P. E. Anuta, L. Bartolucci, E. Dean, F. Lozano, E. Malaret, C. D. McGillem, J. Valdes, and C. Valenzuela *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 1-6 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30386*# Environmental Research Inst. of Michigan, Ann Arbor.
SCAN-ANGLE AND DETECTOR EFFECTS IN THEMATIC MAPPER RADIOMETRY
Michael D. Metzler and William A. Malila *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 23-27 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30387*# Environmental Research Inst. of Michigan, Ann Arbor.
THEMATIC MAPPER SPECTRAL DIMENSIONALITY AND DATA STRUCTURE
E. P. Crist and R. C. Cicone *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 28-31 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30388*# Arizona Univ., Tucson.
MTF ANALYSIS OF LANDSAT-4 THEMATIC MAPPER Abstract Only
Robert Schowengerdt *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 32 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30389*# Geological Survey, Flagstaff, Ariz.
INTRABAND RADIOMETRIC PERFORMANCE OF THE LANDSAT-4 THEMATIC MAPPER
Hugh H. Kieffer, Eric M. Eliason, and Pat S. Chavez, Jr. *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 33-34 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30391*# European Space Agency, Frascati (Italy).
STATUS OF THE ESA-EARTHNET LANDSAT-4 TM GROUND PROCESSING CHAIN
L. Fusco *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 40-45 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30392*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN ANALYSIS LANDSAT-4 THEMATIC MAPPER GEOMETRIC PROPERTIES
R. E. Walker, A. L. Zobrist, N. A. Bryant, B. Gokhman, S. Z. Friedman, and T. L. Logan *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 46-49 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30393*# Systems and Applied Sciences Corp., Hyattsville, Md.
THE USE OF LINEAR FEATURE DETECTION TO INVESTIGATE THEMATIC MAPPER DATA PERFORMANCE AND PROCESSING
Charlotte M. Gurney *In* NASA. Goddard Space Flight Center

LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 50-52 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30395*# Research and Data Systems, Inc., Lanham, Md.
AN ANALYSIS OF THE HIGH FREQUENCY VIBRATIONS IN EARLY THEMATIC MAPPER SCENES
John Kogut and Elaine Larduinat *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 54 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30396*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ASSESSMENT OF THEMATIC MAPPER BAND-TO-BAND REGISTRATION BY THE BLOCK CORRELATION METHOD Abstract Only
Don H. Card, Robert C. Wrigley, Frederick C. Mertz (Technicolor Government Services, Inc., Moffett Field, Calif.), and Jeff R. Hall (Technicolor Government Services, Inc., Moffett Field, Calif.) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 55-58 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30400*# State Univ. of New York, Syracuse.
THE EFFECT OF POINT-SPREAD FUNCTION INTERACTION WITH RADIANCE FROM HETEROGENEOUS SCENES ON MULTITEMPORAL SIGNATURE ANALYSIS
M. J. Duggin and L. B. Schoch *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 64-68 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30401*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RADIOMETRIC ACCURACY ASSESSMENT OF LANDSAT-4 MULTISPECTRAL SCANNER (MSS) DATA
William L. Alford and Marc L. Imhoff *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 69-72 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30408*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
IMPACT OF LANDSAT MSS SENSOR DIFFERENCES ON CHANGE DETECTION ANALYSIS
William C. Likens and Robert C. Wrigley *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 87-90 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 14B

N84-30411*# California Univ., Berkeley. Remote Sensing Research Program.
CHARACTERIZATION OF LANDSAT-4 TM AND MSS IMAGE QUALITY FOR INTERPRETATION OF AGRICULTURAL AND FOREST RESOURCES Abstract Only
S. D. Degloria and R. N. Colwell *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 98-102 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30412*# Earth Satellite Corp., Chevy Chase, Md.
EVALUATION OF LANDSAT-4 THEMATIC MAPPER DATA AS APPLIED TO GEOLOGIC EXPLORATION: SUMMARY OF RESULTS
Jon D. Dykstra, Charles A. Sheffield, and John R. Everett *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 103-108 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01

N84-30416*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ASSESSMENT OF COMPUTER-BASED GEOLOGIC MAPPING OF ROCK UNITS IN THE LANDSAT-4 SCENE OF NORTHERN DEATH VALLEY, CALIFORNIA
Nicholas M. Short *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 114-115 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30419*# Delaware Univ., Newark. Coll. of Marine Studies.
ABOVEGROUND BIOMASS ESTIMATION IN A TIDAL BRACKISH MARSH USING SIMULATED THEMATIC MAPPER SPECTRAL DATA
Michael Hardisky and V. Klemas *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 121-127 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08H

N84-30426*# California Univ., Santa Barbara.
SNOW REFLECTANCE FROM LANDSAT-4 THEMATIC MAPPER
Jeff Dozier *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 142-147 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08L

N84-30427*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PRELIMINARY EVALUATION OF TM FOR SOILS INFORMATION Abstract Only
David R. Thompson, Keith E. Henderson, A. Glen Houston, and David E. Pitts *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 148 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08M

N84-30428*# Natural Environment Research Council, Swindon (England).
THE USE OF THEMATIC MAPPER DATA FOR LAND COVER DISCRIMINATION: PRELIMINARY RESULTS FROM THE UK SATMAP PROGRAMME
M. J. Jackson, J. R. Baker, J. R. G. Townshend, J. E. Gayler, and J. R. Hardy *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 149-152 Prepared in cooperation with Reading Univ., England ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30429*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT-4 THEMATIC MAPPER SCENE CHARACTERISTICS FOR A SUBURBAN AND REGIONAL TEST SITE
David L. Toll *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 153-159 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30431*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPARISON OF LAND COVER INFORMATION FROM LANDSAT MULTISPECTRAL SCANNER (MSS) AND AIRBORNE THEMATIC MAPPER SIMULATOR (TMS) DATA FOR HYDROLOGIC APPLICATIONS
J. C. Gervin, Y. C. Lu (Computer Sciences Corp., Silver Spring, Md.), and R. F. Marcell (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 167-170 ERTS (For

primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08B

N84-30434*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GLOBAL HYDROLOGIC CYCLE
Albert Rango *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A1-A4 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08H

N84-30435*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GLOBAL BIOGEOCHEMISTRY: AN OVERVIEW
Berrien Moore, III *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A5-A7 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08B

N84-30436*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BIOGEOCHEMICAL CONSIDERATIONS
C. C. Delwiche *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A8-A10 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08B

N84-30439*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FOREST ENVIRONMENTS
Paul Zinke *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A18-A20 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 02F

N84-30445*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
POLAR GLACIOLOGY
Gordon deQ. Robin *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A37-A40 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08L

N84-30446*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEA ICE
Stephen F. Ackley *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A41-A43 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08L

N84-30461*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SENSITIVITY OF SLR BASELINES TO ERRORS IN EARTH ORIENTATION
David E. Smith and Demos C. Christodoulidis *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08E

N84-30467*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEODYN SYSTEMS DEVELOPMENT
Barbara H. Putney *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08G

N84-30472*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEASAT ALTIMETRY FOR SURFACE HEIGHT OF INLAND SEAS
Jean E. Welker *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08J

N84-30473*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ACCURACY OF MAPPING THE EARTH'S GRAVITY FIELD FINE STRUCTURE WITH A SPACEBORNE GRAVITY GRADIOMETER MISSION
Werner D. Kahn *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08B

N84-30474*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOIL MOISTURE FROM TEMPERATURE MEASUREMENTS AT THE EARTH'S SURFACE, UPDATE
Jean E. Welker *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08M

N84-30494# Joint Publications Research Service, Arlington, Va.
INTERPRETING SPECTRA OF SEA SURFACE AERIAL PHOTOGRAPHS Abstract only
A. G. Luchinin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 73 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 331-334 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30496# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
DIGMAP, AN INTERACTIVE GRAPHIC SUPPORT SYSTEM FOR MINE SURVEY [DIGMAP, EIN INTERAKTIVES GRAPHISCHES SYSTEM ZUR UNTERSTUETZUNG MARKSCHEIDERISCHER ARBEITEN]
Rudolph Dann *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 7-10 In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30497# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AUTOMATIC SYMBOL GENERATING FOR TOPOGRAPHIC MAPS USING RASTER DATA PROCESSING FOLLOWING THE EXAMPLE OF THE GENERAL TOPOGRAPHIC MAP 1:200,000 (TUEK 200) [AUTOMATISCHE SYSBOLERZEUGUNG FUER FOPOGRAPHISCHE KARTEN DURCH DIGITALE RASTERDATENVERARBEITUNG AM BEISPIEL DER TOPOGRAPHISCHEN UEBERSICHTSKARTE 1:200,000 (TUEK 200)]
Matthias Giebels *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 11-25 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30498# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
APPLICATION OF FASTRAK BY SKANDINAVISK AUTODIGITALISERINGS AB (SADAB) CARTOGRAPHIC SERVICE [ANWENDUNG VON FASTRAK BEI SADAB KARTOGRAPHISCHES SERVICEBUERO]
Peter W. Hilton *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 27-33 In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30501# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
FOREST GENERALIZATION BY DIGITAL RASTER DATA PROCESSING [WALDGENERALISIERUNG DURCH DIGITALE RASTERDATENVERARBEITUNG]
Hans-Guenter Lay and Wigand Weber *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 61-71 refs IN GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30502# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
COOPERATIVE LINE EXTRACTION OF AERIAL PHOTOS AND MAPS [KOOPERATIVE LINIENEXTRAKTION AUS LUFTBILD UND KARTE]
Reinhard Lubkowitz *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 73-82 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30505# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AN INVESTIGATION OF THE REPRODUCTION OF THE GENERAL TOPOGRAPHIC MAP 1:200,000 IN SHORTENED SCALE WITH A DIGITAL RASTER DATA PROCESSING SYSTEM [ERFAHRUNGEN BEI DER REPRODUKTION DER TOPOGRAPHISCHEN UEBERSICHTSKARTE 1:200,000 IN VERKUERZTER SKALA MIT EINEM DIGITALEN RASTERDATENVERARBEITUNGSSYSTEM]
Heinz Meurisch and Wigand Weber *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1984 p 109-141 refs In GERMAN; ENGLISH summary Original contains color illustrations (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30507# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
RASTER PROCESSING FOR REGIONAL PLANNING TASKS [RASTERVERARBEITUNG FUER DIE AUFGABENSTELLUNG RAUMBEZOGENER PLANUNG]
Wolfgang Ophoff *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 157-165 In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30508# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
THE AUTOMATED CADASTRAL PLAN, A SOURCE FOR THE TOPOGRAPHIC COUNTRY MAP WORKS [DIE AUTOMATISIERTE LIEGENSCHAFTSKARTE (ALK), EINE QUELLE FUER DIE TOPOGRAPHISCHEN LANDESKARTENWERKE]
Wilfried Staufenbiel *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 167-175 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30509# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
SUGGESTION FOR A CARTOGRAPHIC PATTERN RECOGNITION SYSTEM USING DIGITAL RASTER DATA PROCESSING METHODS [FORSCHLAG FUER EIN SYSTEM ZUR KARTOGRAPHISCHEN MUSTERERKENNUNG NACH METHODEN DER DIGITALEN RASTERDATENVERARBEITUNG]
Wigand Weber *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 177-189 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N84-30528*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DEVELOPMENT OF A LIGHTWEIGHT NICKEL ELECTRODE
Doris L. Britton and Margaret A. Reid Aug. 1984 20 p refs
(NASA-TM-83739; E-1967; NAS 1.15:83739) Avail: NTIS HC A02/MF A01 CSCL 10C

Nickel electrodes made using lightweight plastic plaque are about half the weight of electrodes made from state of the art sintered nickel plaque. This weight reduction would result in a significant improvement in the energy density of batteries using nickel electrodes (nickel hydrogen, nickel cadmium and nickel zinc). These lightweight electrodes are suitably conductive and yield comparable capacities (as high as 0.25 AH/gm (0.048 AH/sq cm)) after formation. These lightweight electrodes also show excellent discharge performance at high rates. Author

N84-30529*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
MULTI-100kW: PLANAR LOW COST SOLAR ARRAY DEVELOPMENT Final Report
Jul. 1984 62 p
(Contract NAS8-32981)
(NASA-CR-171119; NAS 1.26:171119; LMSC-D973431) Avail: NTIS HC A04/MF A01 CSCL 10A

Seven low cost multi-100 kW planar solar array modules were fabricated and tested. Two different designs were used, demonstrating advanced solar array construction practices. Both module types utilized second generation gridded back cells featuring high efficiency and IR transparency. A silicon dioxide AR coating optimized for transmission at gamma = 1.7 microns was applied to the back surface. Two interconnect types, a single sheet printed circuit and a roll type, with alternate approaches to increasing transparency and reducing cost were designed and fabricated. Hinge stress and electrical power optimization were also examined. Two point designs were studied. The first design used a collage longeron mast and is autonomously deployable. The second design used a Stac Beam for high natural frequency response and required astronaut assistance and assembly on orbit. It was conclusively demonstrated that planar arrays are the most cost effective design for use on the space station or other high power applications. E.R.

N84-30530# Flowpower, Inc., Huntington Station, N.Y.
HIGH YIELD WIND ENERGY RESOURCES IN THE MID-HUDSON RIVER BASIN Final Report
P. M. Sforza, M. J. Smorto, B. Bailey, and R. Wheeler Dec. 1983 114 p refs Sponsored by New York State Energy Research and Development Authority and Central Hudson Gas and Electric Corp. Prepared in cooperation with State Univ. of New York, Albany
(PB84-184951; NYERDA-83-16) Avail: NTIS HC A06/MF A01 CSCL 10A

The results of a wind resource assessment program in the mid-Hudson River Basin area that resulted in a year long hourly record of wind speed and direction data at two tower levels and four sites are discussed. Three of these sites are typical of the exposed hilly terrain characteristic of the Catskill Region. The average annual wind speed was 12.6 to 15.4 miles per hour at the 100 foot tower level. The performance of wind systems ranging in capacity from 55 to 7200 kW was evaluated using the hourly wind data and manufacturer supplied power curves. Total energy production and cost estimates for these wind systems were than used to calculate levelized cost of energy and internal rate of return calculations, for the wind systems evaluated. GRA

N84-30531# Institute of Gas Technology, Chicago, Ill.
EFFECTS OF H2S ON MOLTEN CARBONATE FUEL CELLS
Robert J. Remick and G. L. Anderson Apr. 1984 62 p refs
(Contract DE-AC21-83MC-20212)
(DE84-010485; DOE/MC-20212/1569) Avail: NTIS HC A04/MF A01

The results of a literature survey conducted by the Institute of Gas Technology (IGT) under Phase 1 of a multiphase program to investigate and identify the mechanism(s) responsible for molten carbonate fuel cell (MCFC) performance losses when operating on sulfur containing gases are discussed. The objective was twofold: to review the reported data on the interaction of H2S with nickel containing materials; and to review reported investigations on the specific effects of H2S on the electrochemical oxidation of H2 in MCFC. The ultimate goal of the literature review was to determine the poisoning mechanism. DOE

N84-30532# Sandia Labs., Albuquerque, N. Mex.
PHOTOVOLTAIC CONCENTRATORS: PRESENT STATUS AND FUTURE ROLE
E. C. Boes 1984 2 p refs Presented at Ann. Meeting of the Am. Solar Energy Soc., Anaheim, Calif., 5 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-005520; SAND-84-0081C; CONF-840622-1) Avail: NTIS HC A02/MF A01

A summary of the status of photovoltaic concentrator research and development is presented. Several array fields that use Fresnel lense concentrators are examined. Fabrication costs of the cell assemblies are discussed as well as the current status of silicon, gallium arsenide and multijunction concentrator cell research. M.A.C.

N84-30533# Radiation Monitoring Devices, Inc., Watertown, Mass.
LOW COST, SPRAYED CuInSe2 SOLAR CELL RESEARCH Semiannual Progress Report, 15 Sep. 1983 - 15 Mar. 1984
L. Moy, M. Squillante, and G. Entine 1984 28 p refs
(Contract DE-AC02-82ER-13026)
(DE84-010480; DOE/ER-13026/2) Avail: NTIS HC A03/MF A01

This program on CuInSe2 is investigating a powerful new spray pyrolysis technique as a way to produce efficient solar cell devices by a process which will allow for large scale production of solar cells. The first part of the program was devoted to taking advantage of the chemistry of this new process and to using this spray solution to deposit and characterize the film properties of sprayed CuInSe2 films to identify problems and limitations. During the effort problems were confronted which were also observed by other researchers using various deposition methods. The most serious of these, extra phases and interlayer diffusions, have been individually solved. Experimental methods to apply both solutions to the sprayed films should result in significantly improved device performance. The final period is designed to carry out these methods and demonstrate that efficient devices can be fabricated on sprayed films. DOE

N84-30534# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
REQUIREMENTS FOR HIGH-TEMPERATURE AIR-COOLED CENTRAL RECEIVERS
J. D. Wright and R. J. Copeland Dec. 1983 5 p refs
(Contract DE-AC02-83CH-10093)
(DE84-000081; SERI/TP-252-2030) Avail: NTIS HC A02/MF A01

The design of solar thermal central receivers will be shaped by the end user's need for energy. This paper identifies the requirements for receivers supplying heat for industrial processes or electric power generation in the temperature range 540 to 1000(0)C and evaluates the effects of the requirements on air cooled central receivers. Potential IPH applications are identified as large baseload users that are located some distance from the receiver. In the electric power application, the receiver must supply heat to a pressurized gas power cycle. The difficulty in providing cost effective thermal transport and thermal storage for air cooled receivers is a critical problem. DOE

N84-30535# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
PERFORMANCE TESTS OF THE SOLAR STEAM, INCORPORATED, 9-m DEEP-DISH SOLAR CONCENTRATING COLLECTOR
K. Masterson and H. Gaul Nov. 1983 45 p refs
(Contract DE-AC02-83CH-10093)
(DE84-000079; SERI/TR-255-1505) Avail: NTIS HC A03/MF A01

Thermal and optical data were collected and compared to determine system efficiency and optical accuracy. Mirror reflectance (0.83), receiver absorptance (0.95), and the transmittance factor due to aperture blockage (0.915) gave a rho tau (ALPHA) product of 0.72. The beam spread due to the reflector surface was measured to be 19 mrad from off axis thermal performance and 24 mrad by the Reverse Illumination Method, which is described in detail. The beam spread and concentration ratio combine to give an intercept factor of 0.99 for the 58 cm diameter receiver and total optical efficiency of 0.71. Thermal performance was measured using temperature increases in the output for various water flow rates. The data were fit using a theoretical model for thermal receiver losses. From this curve the optical efficiency was found to be 0.69 and the stagnation or zero flow temperature of the receiver was estimated to be about 470 C. Above 85 C output temperature, better performance was predicted when using a 40 cm diameter receiver. Construction details of the collector are also given. DOE

N84-30536# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
PHOTO/BIOLOGICAL HYDROGEN PRINCIPAL INVESTIGATORS REVIEW MEETING: PROCEEDINGS OF THE MAY 1983 PROGRAM REVIEW
Nov. 1983 147 p refs Meeting held at Golden, Colo., 20 May 1983
(Contract DE-AC02-83CH-10093)
(DE84-000083; SERI/CP-231-2075; CONF-8305137) Avail: NTIS HC A07/MF A01

Progress reports on research conducted in support of the Photo/Biological/Hydrogen Program are presented. Individual reports are abstracted for inclusion in the Energy Data Base. DOE

N84-30537# SRI International Corp., Menlo Park, Calif.
SPRAY PYROLYSIS OF CADMIUM SULFIDE/COPPER INDIUM SELENIDE CELLS Final Report, 1 Jun. 1982 - 30 Nov. 1983
J. B. Mooney, R. H. Lamoreaux, and C. W. Bates, Jr. (Stanford Univ.) Mar. 1984 38 p refs
(Contract DE-AC02-83CH-10093)
(DE84-004491; SERI/STR-211-2279) Avail: NTIS HC A03/MF A01

This report describes work done on developing a low cost method for producing a promising CuInSe2/CdS solar cell. Previous programs resulted in a cell with 2.5% efficiency. The chemistry of the spray solutions were subsequently studied, as well as the conditions of deposition, to improve the quality of the CuInSe2 layers. The major modification was replacing CuCl for the copper source with CuCl2. The chalcopyrite form of CuInSe2 was deposited in the films over a range of composition variables. The problems of crystal phase and second phases were also addressed. After a series of experiments, it became clear that the chemical nature of the substrate and its temperature were the controlling factors. Consequently, the glass/Mo/CuInSe2/CdS/In structure was emphasized. Solar cells made by vacuum evaporation on these material layers were subject to low shunt resistances, believed to be the result of pinhole shorts. Preliminary experiments using metal etches to remove the molybdenum have eliminated the shorting paths. Future efforts should be directed toward eliminating the pinhole problem; otherwise, the spray pyrolyzed CuInSe2 appears to have the required structural, electrical, and optical properties. DOE

N84-30538# Energy Systems Group, Inc., Atlanta, Ga.
SIMPLIFIED METHOD FOR ESTIMATING THE COOLING LOADS OF PASSIVE SOLAR SYSTEMS
Jan. 1984 80 p refs
(Contract DE-AC02-82CH-10122)
(DE84-009474; DOE/CH-10122/25) Avail: NTIS HC A05/MF A01

A simplified procedure for estimating the auxiliary cooling load caused by passive solar heating systems is presented. The primary assumption is ideal ventilation such that no auxiliary cooling is required when ambient temperature is below the thermostat setting. Factors based on bin temperature data are used to account for the portion of solar gain which occurs during overheated periods. A nomogram and data for annual analysis of solar aperture cooling loads are presented. Methods of accounting for shading and movable insulation are also discussed. Certain passive solar systems can result in high cooling loads, which may even be great enough to offset the heating load reduction. DOE

N84-30539# Los Alamos Scientific Lab., N. Mex.

ECONOMICS OF A CONCEPTUAL 75 MW HOT DRY ROCK GEOTHERMAL ELECTRIC POWER STATION

Hugh D. Murphy, Robert H. Drake, J. W. Tester, and George A. Zyvoloski 1984 25 p refs Presented at Seminar on Utilization of Geothermal Energy for Elec. Power Production and Space Heating, Florence, 14-17 May 1984
(Contract W-7405-eng-36)
(DE83-015926; LA-UR-83-2258; CONF-840508-1) Avail: NTIS HC A02/MF A01

Man made, Hot Dry Rock (HDR) geothermal energy reservoirs are investigated. An economic modeling study is conducted for a conceptual 75 MW(e) generation station. The reservoir required for 75 MW(e), equivalent to 550 MW of thermal energy, uses at least 9 wells drilled to 4.3 km and the temperature of the water produced should average 230(0)C. Thermodynamic considerations indicate that a binary cycle should result in optimum electricity generation and the best organic fluids are refrigerants R-22, R-32, R-115 or R-600a (isobutane). The break-even bus bar cost of HDR electricity is computed by the levelized life-cycle method, and found to be competitive with most alternative electric power stations in the US. DOE

N84-30540# Department of Energy, Washington, D. C. Office of Energy Systems Research.

PROCEEDINGS OF THE DOE PHYSICAL AND CHEMICAL ENERGY STORAGE ANNUAL CONTRACTORS' REVIEW MEETING

Sep. 1983 295 p refs Meeting held in Arlington, Va., 12-14 Sep. 1983
(DE83-017536; CONF-830974) Avail: NTIS HC A13/MF A01

Abstracts are prepared for the papers presented in the following areas of interest: (1) thermal energy storage for building heating and cooling and industrial applications; (2) solar thermal energy storage; (3) developmental thermal energy storage; (4) chemical/hydrogen energy systems; (5) mechanical energy storage; (6) superconducting magnetic energy storage; and (7) underground energy storage. DOE

N84-30541# Department of Energy, Washington, D. C. Conservation and Renewable Energy Inquiry and Referral Service.

IS THE WIND A PRACTICAL SOURCE OF ENERGY FOR YOU?

1984 7 p
(DE84-010936; DOE/CE-0062) Avail: NTIS HC A02/MF A01

The facts which must be considered in determining the feasibility of wind energy for a particular application are briefly introduced. Seven steps are listed for making the determination: evaluating potential legal and environmental problems, evaluating energy requirements, evaluating the wind resource, selection of the system and its components, evaluation of the cost of the system with federal and state incentives, and other considerations. DOE

N84-30542# Meridian Corp., Falls Church, Va.

OCEAN ENERGY TECHNOLOGY PROGRAM Summary Report, FY80-83

Richard J. Kottler, Jr. Sep. 1983 129 p refs
(Contract DE-AC01-82CE-30719)
(DE84-012052; DOE/CE-30719/T2) Avail: NTIS HC A07/MF A01

A summary of the experience gained through activities sponsored by the US Department of Energy's Ocean Energy Technology Division (DOE/OETD) was performed with the purpose of providing the private and public sectors with information upon which to base future technology development decisions. The program summary was conducted to only reflect FY 80-83 activities, since documentation of pre-FY 80 program activities is readily available. The summary is structured to coincide with the current management organization. Each summary is the product of extensive technical literature reviews, management report reviews, and discussions with key DOE personnel and representatives from the six lead field organizations. Each section is focused on reviewing the major activities and explaining the progression of these activities from a management decision making perspective. In addition, included in each section is a summary of major areas of future investigation and a list of major activities by fiscal year. DOE

N84-30543# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

TECHNICAL AND COST POTENTIAL FOR LIGHTWEIGHT, STRETCHED-MEMBRANE HELIOSTAT TECHNOLOGY

L. M. Murphy Jan. 1984 8 p refs Presented at the 6th Ann. ASME Solar Energy Div. Tech. Conf., Las Vegas, Nev., 8-12 Apr. 1984
(Contract DE-AC02-83CH-10093)
(DE84-004433; SERI/TP-253-2079; CONF-840402-4) Avail: NTIS HC A02/MF A01

The development of a potentially low cost, concentrating reflector design is described. The reflector is called the stretched mambrane concept. The proposed collector design approach offers effective cost and performance opportunities for improving photovoltaic and solar daylighting applications. Some of the advantages include a reflector, a support frame, and support structures that can be made extremely lightweight and low in cost because of the effective use of material with high average stress levels in the reflector and support frame; a 75% reduction in the weight of the reflector and support structure (down to the drive attachment) over the second generation glass and metal heliostat concept; a better than 50% cost reduction for the reflector assembly and support structure compared to corresponding elements of the second generation concept; and optical occurances and an annual energy delivery potential close to those attainable with current glass and metal heliostats. Results of initial design studies, performance predictions, analysis and results corresponding to subscale are measured. DOE

N84-30544# Department of Energy, Washington, D. C. Photovoltaic Energy Technology Div.

PHOTOVOLTAICS: ELECTRICITY FROM SUNLIGHT, FIVE-YEAR RESEARCH PLAN, 1984-1988

May 1983 35 p refs
(DE84-010679; DOE/CE-0072) Avail: NTIS HC A03/MF A01

The five year research plan concentrates on photovoltaic research and development and limits system experiments to only those necessary to stimulate industrial confidence in the validity of research findings. A key strategy element is the continuation of the informal government/industry partnership which is critical to successful development of photovoltaic technology. The primary research emphasis is the development of promising new approaches to photovoltaic cells such as thin film and multi junction concepts. Emphasis is also placed on completing the development of flat plate silicon designs which yield improved conversion efficiencies and are amenable to automated production. Other research areas include the development of improved array fields, power conditioners, and concentrator collectors. DOE

N84-30545# Missouri Univ., Kansas City. Dept. of Physics.

PASSIVE YAW DAMPING OF A TEETERED ROTOR VERSUS DELTA-3 ANGLE VALUES

Paul J. Bryant 1984 3 p refs
(Contract DE-FG47-81R7-01221)
(DE84-009758; DOE/R7-01221/T1) Avail: NTIS HC A02/MF A01

A series of preliminary experiments are used to delineate the combinations of passive cyclic pitching conditions which are favorable. The conditions surveyed include: (1) upwind and downwind modes of operation; (2) a wide range of delta3 angle settings, from +70 degrees to -70 degrees; (3) rotor angular speeds from 300 to 750 rpm; and (4) the resulting ranges of teeter angles and yaw rates. Negative settings of the delta3 angle and large positive delta3 values cause pronounced instabilities for both upward and downwind modes. With delta3 angle settings from 0 degrees to 45 degrees the teetered rotor in the downwind mode ran at a continuous yaw angle to the free stream wind. Midrange delta3 angle values for an upwind, tailvane stabilized, rotor are favorable. DOE

N84-30546# Missouri Univ., Kansas City. Engineering School.
OPERATION AND CALIBRATION OF THE WINCHARGER 450 MODEL SWECS
Paul J. Bryant and Mark Boeh 1984 3 p refs
(Contract DE-FG47-81R7-01221)
(DE84-009757; DOE/R7-01221/T3) Avail: NTIS HC A02/MF A01

This paper presents an analysis of the operation of the new 450 model Wincharger. Assembly, testing, output power calibrations and other operational parameters are presented. Techniques of testing are described, including the use of a pickup truck for Controlled Velocity Tests (CVT). The measured output power was just above the rated values when only 12 volts was applied to the generator field. When a separate and constant 15 volt field was applied the output ranged from 46 watts for a 10 mi/h wind speed to 1146 watts for 35 mi/h. At the rated 25 mi/h speed an output of 774 watts was obtained by tuning a resistive load. These values are much greater than the ratings for this unit. However, it is being tested here with a separate field supply and without a voltage regulator. DOE

N84-30547# Pacific Northwest Lab., Richland, Wash.
OVERVIEW OF WIND TURBINE SITING CONSIDERATIONS
L. L. Wendell Mar. 1984 11 p refs Presented at the 11th Ann. Energy Technol. Conf., and Exposition, Washington, D.C., 19-21 Mar. 1984
(Contract DE-AC06-76RL-01830)
(DE84-011686; PNL-SA-12081; CONF-840302-4) Avail: NTIS HC A02/MF A01

The meteorological siting considerations over a broad range of time and space scales is reviewed and issues where further research is needed are addressed. The development of siting guidelines for the utility application of wind turbines as a vehicle for examining the issues is examined. The siting guidelines were given a trial application with two participating utilities. DOE

N84-30548# Public Service Electric and Gas Co., Newark, N. J.
BATTERY ENERGY STORAGE TEST (BEST) FACILITY Progress Report, Apr. 1984
E. A. Hyman Apr. 1984 105 p refs Sponsored in part by EPRI
(Contract DE-AC02-76ET-29368; EPRI Proj. 255-2)
(DE84-012127; EPRI-EM-2995; PR-3) Avail: NTIS HC A06/MF A01

The testing and evaluation of battery energy storage systems, including associated electrical conversion equipment developed for use on electric power grids is described. The following results are reported: completion of baseline facility construction including ac link to 13.8-kV PSE and G substation; installation of all operating equipment; completion of operational acceptance test; preparation of procedures and protocols for all phases of operation, maintenance, data management, personnel training, and public relations; operated 1.8-MWh station battery, 2.5-MW ac/dc converter, and computer control system for one year in a series of cycling modes representing various utility applications; preparation of Bay-2 for installation in September 1983 of a 500-kWh zinc chloride battery including a 300-kW ac/dc converter and control system; planning for installation in October 1983 in Bay 1 a 500-kW, 500-kWh lead acid battery with converter and control system; and demonstration that the facility does meet project objectives as a focal point for a national program to commercialize battery energy storage systems. DOE

N84-30549# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Fachbereich Mechanik.
GERMAN-ARGENTINIAN R AND D PROJECT FOR THE UTILIZATION OF WIND ENERGY Final Report, Feb. 1982
Karl-Heinz Axenath, Albert Fritzche, Kurt Rogalla, Juergen Schmelzle, Dieter Welte, Guenther Wirths, Gerd Tetzlaff (Technische Univ., Hannover), and Arne Vollan (GTD Gesellschaft fuer Technische-Wissenschaftliche Datenverarbeitung mbH) Bonn Bundesministerium fuer Forschung und Technologie May 1984 90 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-84-080; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19

A 20 kW wind energy converter was developed. Performance tests of all components up to wind speeds beyond the operational range are very successful. Author (ESA)

N84-30550# Alabama Univ., Huntsville.
THE DESIGN AND TESTING OF AN ELECTROLYTE DESTRATIFICATION SYSTEM APPLIED TO A 96 V ALCO 2200 BATTERY Final Report
D. Nowak and K. Tomantschger Jan. 1984 35 p refs Prepared for Aerospace Corp.
(PB84-184894; UAH-393) Avail: NTIS HC A03/MF A01 CSCL 10C

A pump system for electrolyte destratification in off-the-shelf conventional lead acid batteries was designed and tested at various operating temperatures. The system requires no modification to the battery case. The pump is inserted through small (3 to 4 mm) holes in the battery case top. The system applied was to a 96 V ALCO 2200 battery. The charge time was cut in half, the water loss was minimized, and overall efficiencies for the modified ALCO 2200 increased. Leakage problems were experienced in some modules due to the deterioration of the glue which attaches the air-lift pump manifolds onto the battery cover. The tests were performed on a 48 V system and extrapolated to a 96 V system. Author (GRA)

N84-30551# CBI Industries, Inc., Oak Brook, Ill.
SHELF MOUNTED OCEAN THERMAL ENERGY CONVERSION PLATFORM, REVISED PRELIMINARY REPORT
Mar. 1984 39 p refs
(PB84-185230; NOAA-84041304) Avail: NTIS HC A03/MF A01 CSCL 10A

This report relates model tests of a generic Ocean Thermal Energy Conversion (OTEC) platform. The objective of these tests is to aid in the evaluation of new OTEC designs and to present a data base for design purposes. The test plant has been designed to provide a data base for comparison with current and projected analytical tools as well as comparisons of results from one model configuration to another. The new conceptual OTEC designs are different from the typical offshore (jacket type) structure which is quite transparent to waves. The major difference is the addition of large submerged power production modules to the frame. These proposed modules offer a large surface area to obstruct the flow and thereby increase the global wave forces acting on the structure. GRA

N84-30552# Puerto Rico Univ., San Juan. Center for Energy and Environment Research.
DEVELOPMENT OF ALTERNATIVE ENERGY SCIENCE AND ENGINEERING IN THE CARIBBEAN Final Report
Juan A. Bonnet, Jr. Dec. 1983 48 p Sponsored in part by DOE
(Grant NSF INT-83-02757)
(PB84-181106; CEER-S-180) Avail: NTIS HC A03/MF A01 CSCL 10A

The conclusions and recommendations of the Solar Energy Utilization Workshop for the Caribbean Basin were summarized. Wind power utilization and biomass energy production were discussed briefly. Solar energy conversion research at the University of Florida was presented. R.S.F.

N84-30553# Simpson Weather Associates, Charlottesville, Va.
WIND ENERGY ASSESSMENT FOR WESTERN MARYLAND Final Report
Michael Garstang 3 Jan. 1984 115 p refs Sponsored by Maryland Power Plant Siting Program
(PB84-184613; PPSP/PPRP-86) Avail: NTIS HC A06/MF A01 CSCL 10A

A substantial and systematic body of wind velocity measurements near the surface was assembled for three sites in western Maryland. These data were subjected to careful quality control and were compiled in well documented computer compatible format suitable for general use by other scientists, engineers and technical planners. Author (GRA)

N84-30554# Woodward-Clyde Consultants, Rockville, Md.
GEOTECHNICAL AND GEOLOGIC DESIGN CONSIDERATIONS FOR A SHELF MOUNTED OTEC (OCEAN THERMAL ENERGY CONVERSION) FACILITY
J. S. Miller and R. E. Smith 18 Apr. 1984 41 p refs
(PB84-186147; NOAA-84043012) Avail: NTIS HC A03/MF A01 CSCL 10B

Topics relating to the siting of an ocean thermal energy conversion facility off the coast of Oahu, Hawaii are discussed. Anticipated site conditions which would affect information requirements; potential foundation schemes used to identify key geotechnical parameters; techniques available for exploration and site characterization; and geologic and geotechnical factors and uncertainties that may be associated with site exploration and design information are discussed. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N84-30555# Fraunhofer-Inst. fuer Atmosphaerische Umweltforschung, Garmisch-Partenkirchen (West Germany).
SCIENTIFIC ANALYSIS OF EXISTING DATA ON AEROSOL DISPERSION AND TRANSPORT IN A MOUNTAIN VALLEY Final Scientific Report
R. Reiter, H. Mueller, and R. Sladkovic Apr. 1984 74 p
(Contract DAJA45-83-C-0037)
(AD-A142013) Avail: NTIS HC A04/MF A01 CSCL 13/2

Fluorescent particle tracer experiments were conducted to investigate the pollutant transport and dispersion in the north-alpine Loisach river valley. Experimental procedures are outlined. Analysis of data for a variety of meteorological conditions including inversion cases is presented. In all cases the dilution rates were greater than those obtained by the Gaussian plume model with a sigma scheme applying to flat terrain. Highest tracer concentrations were observed with a capping inversion layer. The theoretical part of the straight channel model developed by Gotaas is reviewed. Author (GRA)

N84-30556# Wisconsin Univ., Madison. Dept. of Mechanical Engineering.
INTERMEDIATE-RANGE GRID MODEL AND USER'S GUIDE FOR ATMOSPHERIC SULFUR DIOXIDE AND SULFATE CONCENTRATIONS AND DEPOSITIONS: WISCONSIN POWER PLANT IMPACT STUDY
K. E. Wilkening and K. W. Ragland May 1984 114 p refs Sponsored in part by Wisconsin Public Service Corp., Green Bay and Wisconsin Public Service Corp., Madison and Wisconsin Department of Natural Resources
(Grant EPA-R-806878)
(PB84-189257; EPA-600/3-84-061) Avail: NTIS HC A06/MF A01 CSCL 13B

The UWATM-SOX computer model was developed to address the acid rain problem on a mesoscale. It predicts sulfur dioxide (SO2) and sulfate (SO4) ambient air concentrations and ground level dry and wet (rain or snow) depositions given certain emission and meteorological input data. It is a time-dependent, cell-type model which numerically solves coupled SO2 and SO4 conservation and mass equations described in an exterior frame of reference for a dilute species in the atmospheric boundary layer. The model is written in ASCII FORTRAN and was applied to the Rainy Lake Watershed in northern Minnesota and southern Ontario. A 1-yr simulation with an 11 x 13 x 6 cell structure and hourly meteorological data changes required 50K core space and took 6 h of computer up (CPU) time. Author (GRA)

N84-30557# Battelle Pacific Northwest Labs., Richland, Wash.
CHEMICAL ATTENUATION RATES, COEFFICIENTS, AND CONSTANTS IN LEACHATE MIGRATION. VOLUME 1: A CRITICAL REVIEW Final Report
D. Rai, J. M. Zachara, A. P. Schwab, R. L. Schmidt, D. C. Girvin, and J. E. Rogers Feb. 1984 318 p refs Sponsored by EPRI 2 Vol.
(Contract DE-AC06-65RL-01830; EPRI Proj. 2198-1)
(DE84-009432; EPRI-EA-3356-Vol-1) Avail: NTIS HC A14/MF A01

Data from existing literature on chemical (precipitation/dissolution and adsorption/desorption) and biological (methylation and alkylation) attenuation mechanism that affect aqueous concentrations of elements and thus their geochemical behavior in the subsurface environment was compiled and evaluated. Elements considered for chemical mechanisms were Al, Sb, As, Ba, Be, B, Cd, Cr, Cu, F, Fe, Pb, Mn, Hg, Mo, Ni, Se, Na, S, V, and Zn. The review of biological mechanisms focused on microbiological alkylation of As, Hg, and Se. The information discussed for each elements included: (1) thermodynamic predictions of stable solid and solution species which may be present in the utility waste environment, (2) observed solubility-controlling solids, and (3) a summary of the effect of different geochemical factors that control absorption/desorption. The definitions of constants and examples of their use in calculating attenuation along with extensive tables for thermodynamic equilibrium constants and adsorption/desorption constants for each element are given. Because quantitative information on alkylation is not available, calculations were made under assumed environmental conditions to display and assess the importance of subsurface alkylation reactions. DOE

N84-30558# Kema (N. V.), Arnhem (Netherlands). Dept. of Mechanical Engineering.
ENVIRONMENTAL EFFECTS OF INCREASING THE AMOUNT OF DISTRICT HEATING IN THE NETHERLANDS
J. J. Hof 1983 14 p refs Sponsored by VESTIN
(S/T-Rept-Vol-1-No-5; B8464518; ISBN-90-353-0009-2; ISSN-0167-8590) Avail: NTIS HC A02/MF A01

The environmental consequences of district heating systems are compared. It is concluded that district heating has advantages from an environmental point of view, with respect to heat discharges and air pollution. The thermal load can be reduced by district heating by 70 to 75% compared to separate generation, and SO2 emission can be reduced by 85 to 90%. The NO emission remains unchanged, because the present situation with natural gas, being by far the most important fuel, can hardly be improved. Author (ESA)

N84-30559# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobile Sources.
ANTI-TAMPERING AND ANTI-MISFUELING PROGRAMS TO REDUCE IN-USE EMISSIONS FROM MOTOR VEHICLES
31 Dec. 1983 137 p refs
(PB84-185222; EPA-AA-TSS-83-10) Avail: NTIS HC A07/MF A01 CSCL 13B

The EPA has been collecting data since 1978 on the occurrence of tampering and misfueling to assess the magnitude of the problem. This report examines the rates of tampering and misfueling, the effects of misfueling and disablement of individual emission control components on vehicle emissions, which vehicles are equipped with each emission component, and the estimated cost of repairs. The methodology used to estimate the excess emissions caused by tampering is explained. Programs to prevent misfueling are discussed. Also included is the use of the MOBILE3 emission factor model used to calculate the adjustments to local conditions. GRA

N84-30560# Research Triangle Inst., Research Triangle Park, N.C.
SAMPLING REPORT FOR THE STUDY OF PERSONAL CO (CARBON MONOXIDE) EXPOSURE Final Report
Roy W. Whitmore, Shelton M. Jones, and Martin S. Rosenzweig Apr. 1984 90 p refs
(Contract EPA-68-02-3679)
(PB84-181957; EPA-600/4-84-034) Avail: NTIS HC A05/MF A01 CSCL 14B

The sample selection procedures used for a study funded by the EPA and conducted by the Research Triangle Institute in 1982 and 1983 to evaluate methodology for collecting data on personal exposure to carbon monoxide (CO) are described. These data were collected in the metropolitan areas of Denver, Colorado and Washington, D.C., using personal exposure monitors (PEMs) and activity diaries. This involved telephone screening of households and selection of household respondents for personal exposure monitoring in the metropolitan areas in and around Denver, Colorado and Washington, D.C. Data on CO breath levels were also collected in Washington, D.C. The target population in both cities consisted of the non-institutionalized, non-smoking adults (ages 18 to 70) of these metropolitan areas. Based on the experience gained during the study, the methodology developed, with some modifications, may be used effectively in other areas of the country for collecting PEM data. These modifications should make the methodology more cost effective, improve the response rate, and lead to more accurate acitivity information. Author (GRA)

N84-30561# Office of Technology Assessment, Washington, D.C.
WETLANDS: THEIR USE AND REGULATION
Mar. 1984 212 p ref
(PB84-175918; OTA-0-206; LC-84-601014) Avail: NTIS HC A10/MF A01 CSCL 08A

The findings and conclusions of the Office of Technology Assessment's analysis of approaches to wetlands use are given. Recent trends altered the perception of wetlands as wastelands and conversion to other uses was actively encouraged. There is a growing appreciation for the esthetic and recreational qualities of wetlands; secondly, there is now a general recognition of the hydrological and ecological services that wetlands provide. Pressure to convert wetlands to cropland, commercial development sites, and other uses is still significant in certain regions. This presents a conflict between those who want to convert wetlands to other uses and those who feel they should be left in their natural state. Section 404 of the Federal Water Pollution Control Act, now referred to as the Clean Water Act authorized the U.S. Army Corps of Engineers to regulate the disposal of dredged or fill material into the waters of the U.S., which included many wetlands. Author (GRA)

N84-30562# Environmental Protection Agency, Research Triangle Park, N.C. Environmental Criteria and Assessment Office.
AIR POLLUTION EFFECTS ON AQUATIC ECOSYSTEMS: SUMMARY OF A SYMPOSIUM Final Report
Robert W. Elias, Tonette Bond Inge (Delphi Research Associates, Washington, D.C.), and Paul VonWard (Delphi Research Associates, Washington, D.C.) Apr. 1984 53 p refs
(PB84-185214; EPA-600/9-84-010) Avail: NTIS HC A04/MF A01 CSCL 06C

Summarizing presentations at a symposium on air pollutant effects on aquatic ecosystems, this document includes an overview of U.S. research programs, atmospheric emissions and deposition, cycling processes, and effects on plants and animals. Current U.S. research addresses ecosystem classification and inventory by sensitivity to acidity, interactions between watershed terrestrial and aquatic ecosystems, and effects. Atmospheric input to aquatic ecosystems may be gaseous or particulate and by wet and dry deposition. Particle dry deposition is most predictable, gaseous dry deposition models exist but are not yet reliable for regional scale. Linear correlation may exist between air sulfate content and deposition acidity. Source apportionment has been used to relate deposition to emission sources. Author (GRA)

N84-30563# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
EUROPEAN VIEWS ON CONTROLLING ACID RAIN Final Report
Feb. 1984 17 p refs
(PB84-194208; MIT/EL-84-002) Avail: NTIS HC A02/MF A01 CSCL 13B

The National Governors Association (NGA) will be considering a plan for alleviating acid rain effects by reduction of emissions of sulfur and nitrogen oxides. This plan, in some respects similar to current legislative proposals in Congress, was formulated by the northeastern governors with administrative support from the Commonwealth of Massachusetts. Lt. Governor John Kerry undertook the preparation of this plan for consideration by the NGA. In order to provide a better understanding of how other industrialized nations are dealing with the acid rain problem, the office of Lt. Gov. Kerry arranged for a tour of European countries during the week beginning 10 January 1984. Norway, Sweden, the Federal Republic of Germany (FRG), Belgium and the United Kingdom (UK) were visited, as well as the Commission of the European Communities (EEC) in Brussels. Author (GRA)

N84-30438*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INLAND AQUATIC RESOURCES AND BIOGEOCHEMICAL CYCLES
John M. Melack *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A15-A17 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 13B

N84-30440*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAND BIOLOGY
Edward T. Kanemasu *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A21-A23 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 13B

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N84-30564 Institut d'Aeronomie Spatiale de Belgique, Brussels.
ON MOLECULAR SCATTERING IN THE TERRESTRIAL ATMOSPHERE: AN EMPIRICAL FORMULA FOR ITS CALCULATION IN THE HOMOSPHERE
Marcel Nicolet 1984 23 p refs Submitted for publication
(Aeronomica-Acta-A-284-1984) Avail: Issuing Activity

A determination of the Rayleigh scattering cross section (RS) for air from 0.2 to 1 micron is used to derive an empirical formula: sigma sub RS = 4.02 x 10 to the minus 28th power/lambda to the 4 + x power sq cm where x = 0.389 lambda + 0.09426/lambda - 0.3228 for the spectral region 0.2 microns < lambda < 0.55 microns; accuracy is within + or - 0.5%. From the visible 0.55 microns to the infrared at 1 micron, the same accuracy can be obtained using a constant value, x = 0.04. The formula accounts for the degree of depolarization which varies with the wavelength. Author (ESA)

N84-30565 Institut d'Aeronomie Spatiale de Belgique, Brussels.
TRACE CONSTITUANTS MEASUREMENTS DEDUCED FROM SPECTROMETRIC OBSERVATIONS ONBOARD SPACELAB
C. Lippens, C. Muller, J. Vercheval, M. Ackerman, J. Laurent, M.-P.

Lemaitre, J. Besson, and A. Girard 1984 23 p refs Presented at 25th COSPAR Meeting on Meas. of Minor Species Submitted for publication
(Aeronomica-Acta-A-286-1984) Avail: Issuing Activity

Infrared absorption lines observed by a grille spectrometer on board Spacelab 1 were used to determine CO_2 and CO in the low thermosphere and in the middle atmosphere. Equal abundances of CO and CO_2 are found at 112 km altitude; CO_2 departs from its homospheric volume mixing ratio near 100 km, dropping by a factor of ten 15 km higher. The CO largest number density is observed near 70 km altitude, close to the H Lyman alpha photoproduction peak. Observation of water vapor shows a middle atmospheric mixing ratio of this species within the limits: 2 to 5 ppmv up to 70 km altitude, with a slight increase from 30 to 50 km altitude. The H_2O mixing ratio drops very rapidly above 70 km. The comparison of the results from strong and weak H_2O and CO_2 lines shows the need to introduce a natural Lorentz line width in the line profiles. Author (ESA)

N84-30566*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRATOSPHERIC NO AND NO_2 PROFILES AT SUNSET FROM ANALYSIS OF HIGH-RESOLUTION BALLOON-BORNE INFRARED SOLAR ABSORPTION SPECTRA OBTAINED AT 33 DEG N AND CALCULATIONS WITH A TIME-DEPENDENT PHOTOCHEMICAL MODEL
C. P. Rinsland, R. E. Boughner, J. C. Larsen (Systems and Applied Sciences Corp.), A. Goldman (Denver Univ.), F. J. Murcray (Denver Univ.), and D. G. Murcray (Denver Univ.) Aug. 1984 46 p refs
(NASA-TM-86285; NAS 1.15:86285) Avail: NTIS HC A03/MF A01 CSCL 04A

Simultaneous stratospheric vertical profiles of NO and NO_2 at sunset were derived from an analysis of infrared solar absorption spectra recorded from a float altitude of 33 km with an interferometer system during a balloon flight. A nonlinear least squares procedure was used to analyze the spectral data in regions of absorption by NO and NO_2 lines. Normalized factors, determined from calculations of time dependent altitude profiles with a detailed photochemical model, were included in the onion peeling analysis to correct for the rapid diurnal changes in NO and NO_2 concentrations with time near sunset. The CO_2 profile was also derived from the analysis and is reported. R.S.F.

N84-30567# Kakioka Magnetic Observatory (Japan).
REPORT OF THE GEOMAGNETIC AND GEOELECTRIC OBSERVATIONS, 1982 (RAPID VARIATIONS)
1983 42 p
(KMO-23) Avail: NTIS HC A03/MF A01

The observational results of geomagnetic and geoelectric rapid variations at three manned and two unmanned Japanese observatories are presented. These observations consist of magnetograms, induction magnetograms and tellurigrams. The data given in tables are the results of observations of rapid variations, copies of records of the rapid-run induction magnetograms and rapid-run tellurigrams. Some phenomena are magnetic storms, magnetic sudden impulses, magnetic bays, magnetic solar flare effects, magnetic pulsations and telluric pulsations. E.R.

N84-30568# Institute of Space and Astronautical Science, Tokyo (Japan).
A NUMERICAL STUDY OF ARTIFICIAL ELECTRON AURORA EXPERIMENTS
Kazuo Takayanagi Mar. 1984 35 p refs
(ISAS-611; ISSN-0285-6808) Avail: NTIS HC A03/MF A01

An artificial electron aurora experiment was planned as a part of the SEPAC (Space Experiment with Particle Accelerator) project, one of the first spacelab missions on board the space shuttle. In order to provide the necessary information to the project team in advance of the experiment and to help analyze the data to be obtained, a numerical study was performed for the electron beam penetration into atmosphere and for the excitation and ionization of atmospheric particles. A beam of electrons with energy either 5 keV or 7.5 keV is supposed to be injected downwards at the altitude of 250 km. The penetration of electrons was studied within the framework of the continuous slowing down model. The time necessary for the electron to fall down was estimated. The ionization rate at each altitude range was calculated. The excitation rate was calculated for emission of $N_2(-)$ first negative (0.0) band (wavelength 3914 A), oxygen green line (5577 A), and oxygen red line (6300/6364 A doublet). The contribution of the secondary electrons produced in the processes was taken into account. For the oxygen line emission, particularly for the red line, the collisional quenching reduces the emission intensity considerably. The calculations were done for the three values of the angle between the geomagnetic field and the vertical line and for five values of the electron pitch angle. Results are reported graphically. Author

N84-30569# Institute of Space and Astronautical Science, Tokyo (Japan).
DERIVATION OF CRUSTAL MAGNETIC ANOMALIES FROM MAGSAT
Masahisa Yanagisawa Feb. 1984 68 p refs
(Rept-609; ISSN-0285-6808) Avail: NTIS HC A04/MF A01

Various characteristics of the magnetospheric field, induction field, and ionospheric field observed by MAGSAT and the derivation of crustal magnetic anomalies free from disturbance fields are described. After eliminating the effect of the disturbance field, anomaly maps were derived for the Japanese area and Shatsky Rise area. Spherical harmonic expansion of the magnetospheric field, induction field, and ionospheric field shows that the first degree term could well approximate the magnetospheric and induction fields. These fields can easily be excluded by the subtraction of the best fitted first degree spherical harmonic fields. Close resemblance between dawn and dusk side anomalies show that the maps are nearly free from the effects of induction, ionospheric, and magnetospheric fields. S.B.

N84-30570# Comptroller General of the United States, Washington, D.C.
STRONGER DIRECTION NEEDED FOR THE NATIONAL EARTHQUAKE PROGRAM
26 Jul. 1983 81 p
(GAO/RCED-83-103; B-210587) Avail: NTIS HC A05/MF A01

The National Earthquake Hazards Reduction Program was established to mitigate the impact on communities. Emphasis is placed on: (1) the Federal Emergency Management Agency's (FEMA's) efforts to carry out its lead agency responsibilities for the program; (2) assistance provided to State and local governments in mitigating earthquake hazards; and (3) progress toward developing an operational earthquake prediction system. M.A.C.

N84-30571# National Oceanic and Atmospheric Administration, Washington, D. C.
THE ADVANTAGES OF SOUNDING WITH THE SMALLER DETECTORS OF THE VISSR ATMOSPHERIC SOUNDER
W. Paul Menzel, Thomas H. Achtor, Christopher M. Hayden, and William L. Smith Jul. 1984 26 p refs
(NOAA-TM-NESDIS-6) Avail: NTIS HC A03/MF A01

Results are presented that show sounding with the small infrared detectors on the VISSR Atmospheric Sounders (VAS) produces more temperature profile retrievals of good quality in partly cloudy conditions than was possible with the large detectors. The increased ability to find clear fields of view outweighs the disadvantage of greater detector noise. Author

N84-30572# Science Applications, Inc., McLean, Va.
GEOPHYSICAL PLASMAS AND ATMOSPHERIC MODELING Final Report, 16 Dec. 1982 - 15 Feb. 1984
E. Hyman, P. Chaturvedi, J. Chen, J. Drake, and G. Ganguli Mar. 1984 591 p
(Contract N00014-83-C-2034)
(AD-A142573; AD-E001718; SAI-84/1554) Avail: NTIS HC A25/MF A01 CSCL 04/1

We will describe the major accomplishments in each of the following research efforts: (1) 3D magnetospheric modeling, (2) Tearing instability in an anisotropic neutral sheet, (3) Auroral plasma transport, (4) Magnetic shear effects on the current driven ion cyclotron instability, (5) Instability mechanisms causing high latitude ionospheric irregularities, (6) Auroral instability studies, (7) Nonlinear saturation of low hybrid drift instability and anomalous plasma transport, (8) Laser/HANE theory support, (9) Early time HANE phenomena, (10) Uranium vapor release, (11) Late time HANE striation, (12) Quasi steady state multi plasma cloud configurations in the ionosphere, (13) Chaotic behavior ionospheric processes, (14) Linear dynamics of tropical heat sources and interactions with mid latitudes, (16) The large scale dynamics of the Indian Summer monsoon, (17) Collective particle acceleration (CPA), and (18) Plasma behavior in crossed electric and magnetic fields. GRA

N84-30573# SRI International Corp., Menlo Park, Calif.
HIGH-LATITUDE IONOSPHERIC IRREGULARITIES Annual Scientific Report, 1 Mar. 1983 - 29 Feb. 1984
J. F. Vickrey, R. C. Livingston, R. M. Robinson, and N. B. Walker 10 May 1984 159 p
(Contract F49620-83-K-0025)
(AD-A142648; AFOSR-84-0510TR) Avail: NTIS HC A08/MF A01 CSCL 04/1

This document summarizes studies on the morphology of ionospheric structure at high latitudes. The program encompasses both theoretical and experimental investigations into this rapidly developing field. Because of the vast range of scale sizes (hundreds of kilometers to centimeters) that make up the structure, and the need for time-continuous observations, we employ a diverse set of observational techniques. These include in situ observations from rockets and satellites as well as radio propagation and scattering measurements. Topics include: F-Region Cross-Field Diffusion Processes; High-Latitude Conductivity and Field Aligned Current Systems; Low-Altitude Image Striations Associated with Bottomside Equatorial Spread F--Observations and Theory; Irregularity Decay in an Isolated Plasma Bubble; Electrical Coupling Effects on the Temporal Evolution of F-Layer Plasma Structure; Aurora and Electrojet Configuration in the Early Morning Sector; Auroral Zone Conductivities within the Field-Aligned Current Sheets, and K sub P Dependence of Auroral Zone Field-Aligned Current Intensity. GRA

N84-30574# Air Force Geophysics Lab., Hanscom AFB, Mass.
THE EARTH'S RADIATION BELTS
W. N. Spjeldvik and P. L. Rothwell 20 Sep. 1983 133 p
(AD-A142673; AFGL-TR-83-0240; AFGL-ERP-854) Avail: NTIS HC A07/MF A01 CSCL 04/1

This report develops radiation belt transport theory from physical principles and compares the results with experimental data. It also provides an easy reference to the present empirical radiation flux models with some simple application techniques given. Specialized topics include shell-splitting, effects of wave-particle interactions, the ring current, geosynchronous environment, nuclear detonations and radiation effects. Heavy ions are specifically highlighted as a significant component of the radiation belts. GRA

N84-30575# Weston Observatory, Mass.
GEOKINETIC EFFECTS ON MOTION SENSITIVE INSTRUMENTATION, SYSTEMS AND FACILITIES Final Report, 1 Oct. 1980 - 30 Sep. 1983
F. A. Crowley, E. B. Hartnett, and J. I. Blaney 15 Jan. 1984 111 p
(Contract F19628-81-K-0005)
(AD-A142682; AFGL-TR-84-0031) Avail: NTIS HC A06/MF A01 CSCL 08/11

This report describes research supporting continued refinement and expansion of ground motion knowledge crucial to USAF/DoD/NASA operations and plans. Primary emphasis was directed towards the seismic and seismo-acoustic attributes of field sites and facilities. The effects of ground motion, natural and man-made, on the performance of motion sensitive components, instrumentation and strategic systems were also investigated. Research studies included upgrading the Geokinetic Data Acquisition System (GDAS); operating the system at USAF designated field sites; developing and implementing computational techniques for data analysis; investigating the information capacity for communicating seismically in Basin and Range Valleys; and forecasting the seismo-acoustic environment for Space Transportation System (STS) launches at Vandenberg AFB. Also considered in lesser detail was the improvement of intrusion detection systems; evaluation of seismo-acoustic waves; and the expansion and upgrade of archival seismic files. GRA

N84-30576# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
SOLITON COLLAPSE DURING IONOSPHERIC HEATING
J. P. Sheerin, D. R. Nicholson, G. L. Payne, and Lewis M. Duncan (Los Alamos National Lab.) 1984 5 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. 1984
(Contract W-7405-eng-36)
(DE84-009994; LA-UR-84-1067; CONF-840616-5) Avail: NTIS HC A02/MF A01

Analytical and numerical hf radio waves, the oscillating two stream instability which may dominate the parametric decay instability is presented. The oscillating two stream instability saturates nonlinearly through the formation of solitons which undergo a collisionally damped collapse. This phenomenon was investigated experimentally and results from theoretical and experimental investigations are presented. DOE

N84-30577# California Univ., Livermore. Lawrence Livermore Lab.
RESPONSE TO W. W. KELLOGG'S CARBON DIOXIDE AND CLIMATIC CHANGE
H. W. Ellsaesser Feb. 1984 22 p refs Presented at 12th Intern. Conf. on Global Environ. Probl., Chicago, 24 Nov. 1983 Revised
(Contract W-7405-eng-48)
(DE84-010986; UCRL-89964-Rev-1; CONF-8311100-Rev-1) Avail: NTIS HC A02/MF A01

Three points are made: (1) the contemporary practice of developing consensus views through committees of experts tends more to harden the consensus than to solve or deepen understanding of the problem, (2) the effects cascade tends to appear for more ominous when presented in isolation than when viewed from the receiving end as only one of the many impacting factors, (3) there are valid reasons for questioning the prevailing estimate of 3 + or - 1.5(0)C warming for doubled CO2. DOE

N84-30578# Texas Univ., Austin. Bureau of Economic Geology.
GEOTHERMAL POTENTIAL ALONG THE BALCONES/OUACHITA TREND, CENTRAL TEXAS: ONGOING ASSESSMENT AND SELECTED CASE STUDIES Final Report
C. M. Woodruff, Jr., G. L. Macpherson, Christine Gever, S. Christopher Caran, Ahmed G. ElShazly, Laura Caprio Dwyer, Eric J. Thompson, and David Robert Wuerch Apr. 1984 80 p refs
(Contract DE-AS07-79ID-12057)
(DE84-010826; DOE/ID-12057/T6) Avail: NTIS HC A05/MF A01

A synopsis of the geologic conditions along the Balcones/Ouachita trend is presented. The problems in defining low-temperature resources and in recognizing anomalies are addressed. Local geologic and hydrologic conditions are assayed in terms of ambient thermal regimes, and hypotheses are presented for the origin of thermal waters. DOE

N84-30579# Utah Univ., Salt Lake City. Earth Science Lab.
BIAS REMOVAL FOR CONVENTIONAL MAGNETOTELLURIC DATA
John A. Stodt Sep. 1983 63 p refs
(Contract DE-AC07-79ID-12079)
(DE84-012189; DOE/ID-12079/106; ESL-123) Avail: NTIS HC A04/MF A01

An algorithm was developed fo the removal of autopower bias errors from conventional magnetotelluric (MT) data. Nonlinear equations involving autopowers as unknowns with crosspower coefficients are obtained by cross substitutions between the eight referenced impedance equations to eliminate the four impedances. Although exact solutions to the nonlinear equations can be computed, they are often sensitive to noise components in the crosspower coefficients, due to dependency of the equations as Z/sub xx/ and Z/sub yy/ approach zero or as the coherence between the magnetic field components H/sub x/ and H/sub y/ approaches unity. However, the ordinary coherence functions between various pairs of the horizontal field components provide additional information. This information is incorporated as constraints by developing a constrained iterative solution for the autopowers. The solution is outlined and its usefulness is explored with examples of its application to field data. DOE

N84-30580# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.

USING CHEMICALLY REACTIVE TRACERS TO DETERMINE TEMPERATURE CHARACTERISTICS OF GEOTHERMAL RESERVOIRS

Bruce A. Robinson, Jefferson W. Tester, and Lee F. Brown (Los Alamos Scientific Lab., N. Mex.) Los Alamos, N. Mex. LASL 1984 6 p refs Presented at the Geothermal Resources Council Ann. Meeting, Reno, Nev., 26-29 Aug. 1984
(Contract W-7405-eng-36)
(DE84-011373; LA-UR-84-1186; CONF-840809-10) Avail: NTIS HC A02/MF A01

The rates of most chemical reactions are very sensitive to temperature, and this property can be used to measure temperature patterns in geothermal reservoirs. Two approaches are considered: reverse-flush and flow-through. Both of these can indicate thermal drawdown faster than the measurement of produced-fluid temperature. The reverse-flush approach is more difficult to carry out and interferes more with normal operation, but it gives the earlier indication of thermal drawdown and yields more information when using a single reaction. In both approaches, injecting a suite of reactants can yield bivariate time-temperature distributions which give temperature distributions as functions of fluid residence time. Applications to Hot Dry Rock systems are considered throughout the paper. Results of early kinetics studies of candidate tracer reactions also are reported. DOE

N84-30581# California Univ., Livermore. Lawrence Livermore Lab.

AN ASSESSMENT OF METHODS OF GEOLOGICAL BASIN ANALYSIS FOR APPLICATION TO THE UINTA AND PICEANCE BASINS

Jerry J. Sweeney May 1984 24 p refs
(Contract W-7405-eng-48)
(DE84-012369; UCID-20088) Avail: NTIS HC A02/MF A01

Various methods of characterizing the physical (pressure temperature) history of stratigraphic units in a subsiding basin are examined. Methods are divided into two groups: pactical and computational. Practical methods involve interpretation of compaction and subsidence history from geophysical logs and other geologic data. The method is applied, as an example, from data for the Uinta Basin in northeastern Utah. Computational methods involve calculations simulating physical conditions for a given stratigraphy throughout the time of subsidence. The relative merits of the two methods are discussed and proposals made for initial study of the temperature-pressure history of kerogen bearing rocks of the Uinta or Piceance Basins of northeastern Utah. DOE

N84-30582# Los Alamos Scientific Lab., N. Mex.

INVESTIGATION OF LAMINAR SHOCKS

K. Lee, C. H. Aldrich, S. J. Bame, D. W. Forslund, S. P. Gary, J. T. Gosling, K. B. Quest, M. F. Thomsen, D. Winske, and M. M. Mellott (Iowa Univ., Iowa City) 3 Jul. 1984 5 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract W-7405-eng-36)
(DE84-010074; LA-UR-84-892; CONF-840616-13) Avail: NTIS HC A02/MF A01

Studies of laminar shocks based on international Sun Earth explorers ISEE observations of terrestrial bow shocks, simulation, and theory are presented. DOE

N84-30583# Los Alamos Scientific Lab., N. Mex.

EVOLUTION OF STRUCTURE IN THE PLACES BARIUM CLOUDS

David J. Simons, Charles F. Lebeda (Edgerton, Germeshausen and Grier, Inc., Los Alamos, N. Mex.), Morris B. Pongratz, T. Joseph Fitzgerald (Edgerton, Germeshausen and Grier, Inc., Los Alamos, N. Mex.), and Robert Roussel Dupre Feb. 1984 181 p refs
(Contract W-7405-eng-36)
(DE84-010996; LA-9648-MS) Avail: NTIS HC A09/MF A01

The PLACES (Position Location and Communication Effects Simulations) experiment is discussed. Intensified optical instruments are used to examine the barium ion and neutral resonance fluorescence light from the four barium ionospheric thermite releases. The effects of structured ionospheric plasmas on transionospheric radio communication lines are determined. As part of this experiment, it was necessary to characterize the evolution of the structure (striations) in the barium ionospheric plasma. The motivation for using barium to simulate these effects is examined. The theoretical and empirical basis for using optical diagnostics for deriving the electron column content of the ion clouds is discussed. The time evolution of the power spectral density (PSD) of striations for the electron column density perpendicular to the magnetic field is derived for the two clouds. DOE

N84-30584# Geological Survey, Menlo Park, Calif.

STRATIGRAPHIC AND VOLCANO-TECTONIC RELATIONS OF CRATER FLAT TUFF AND SOME OLDER VOLCANIC UNITS, NYE COUNTY, NEVADA

W. J. Carr, F. M. Byers, Jr., and P. P. Orkild 1984 46 p refs
(Contract DE-AI08-78ET-44802)
(DE84-010926; USGS-OFR-84-114) Avail: NTIS HC A03/MF A01

The Crater Flat Tuff is herein revised to include a newly recognized lowest unit, the Tram member. The revised Crater Flat Tuff is stratigraphically below the Topopah Spring Member of the Paintbrush Tuff and above the Grouse Canyon Member of the Belted Range Tuff, and is approximately 13.6 m.y. old. In outcrops between Calico Hills and Yucca Flat, the Lithic Ridge Tuff overlies a Bullfrog-like unit of reverse magnetic polarity that probably correlates with a widespread unit around and under Yucca Flat, referred to previously as Crater Flat Tuff. This unit is here informally designated as the tuff of Yucca Flat. Geophysical and geologic evidence to date suggests that (1) the source of the Crater Flat Tuff is a caldera complex in the Crater Flat area between Yucca Mountain and Bare Mountain; and (2) there are at last two cauldrons within this complex - one probably associated with eruption of the Tram, the other with the Bullfrog and Prow Pass Members. The complex is named the Crater Flate Prospector Pass caldera complex. DOE

N84-30585# Ohio State Univ., Columbus.

COMPUTATIONAL METHOD FOR THERMOVISCOELASTICITY WITH APPLICATION TO ROCK MECHANICS Ph.D. Thesis

S. C. Lee Jan. 1984 199 p refs
(Contract DE84-003087; Contract DE-AS20-82LC-10886)
(DE84-003087; DOE/LC-10886/1556) Avail: NTIS HC A09/MF A01

Large scale numerical computations associated with rock mechanics problems have required efficient and economical models for predicting temperature, stress, failure, and deformed structural configuration under various loafing conditions. To meet this requirement, the complex dependence of the properties of geological materials on the time and temperature is modified to yield a reduced time scale as a function of time and temperature under the thermorheologically simple material (TSM) postulate. The thermorheologically linear concept is adopted in the finite element formulation by uncoupling thermal and mechanical responses. The thermal responses, based on transient heat conduction or convective diffusion, are formulated by using the two point recurrence scheme and the upwinding scheme, respectively. An incremental solution procedure with the implicit time stepping scheme is proposed for the solution of the thermoviscoelastic response. The proposed thermoviscoelastic solution algorithm is based on the uniaxial creep experimental data and the corresponding temperature shift functions, and is intended to minimize computational efforts by allowing large time step size with stable solutions. A thermoelastic fracture formulation is also presented by introducing the degenerate quadratic isoparametric singular element for the thermally induced line crack problems. DOE

N84-30586# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Sciences Div.

PROPOSED SCIENTIFIC ACTIVITIES FOR THE SALTON SEA SCIENTIFIC DRILLING PROJECT

May 1984 140 p refs
(Contract DE-AC03-76SF-00098)
(DE84-012256; LBL-17716) Avail: NTIS HC A07/MF A01

The Salton Sea Scientific Drilling Project (SSSDP) was organized to investigate a hydrothermal system at depths and temperatures greater than was done before. Plans are to deepen an existing well or to drill a new well for research purposes for which temperatures of 300(0)C will be reached at a depth of less than 3.7 km and then deepen that well a further 1.8 km. The Congressional history of the appropriation to drill the hole and other history through March 1984 is reported and gives a review of the literature on the Salton Sea Geothermal Field and its relationship to other geothermal systems of the Salton Trough, and describes a comprehensive series of investigations proposed either in the well or in conjunction with the SSSDP. Results of investigations in geophysics, geochemistry and petrology, tectonics and rock mechanics, and geohydrology are presented. Current commercial and state of the art downhole tools and their pressure, temperature, and minimum hole size limitations are tabulated. DOE

N84-30587# California Univ., Livermore. Lawrence Livermore Lab.

CHEMICAL EVOLUTION OF A HIGH-LEVEL MAGMA SYSTEM: THE BLACK MOUNTAIN VOLCANIC CENTER, SOUTHERN NEVADA

T. A. Vogel, D. C. Noble, and L. W. Younker Sep. 1983 54 p refs
(Contract W-7405-eng-48)
(DE84-013321; UCRL-53444) Avail: NTIS HC A04/MF A01

Stratigraphically controlled samples of both lavas and ash flow tuffs from the Black Mountain Volcanic center to evaluate magmatic processes were studied. The results of this study are used to: (1) determine how this high level magma system developed; (2) compare this system with other similar systems; and (3) correlate ash flow sheets using their chemical characteristics. DOE

N84-30588# Uppsala Univ. (Sweden).

FIRST OBSERVATIONS OF 140 MHz PLASMA LINE BACKSCATTER DURING HEALTHY EXPERIMENTS AT TROMSOE

A. Hedberg, B. Thide, R. Bostroem, H. Derblom, J. Kopka (Max-Planck Institut fuer Aeronomie, Katlenburg-Lindau, West Germany), and P. Stubbe (Max-Planck Institut fuer Aeronomie, Kaltenburg-Lindau, West Germany) 1984 18 p refs Presented at URSI Open Symp. on Active Expts. in Space Plasmas, Florence, Aug.-Sep. 1984 Submitted for publication Sponsored by Swedish Natural Science Research Council and Deutsche Forschungsgeimschaft
(UIO-SR-84-02; ISSN-0349-2699) Avail: NTIS HC A02/MF A01

The VHF plasma line backscatter was obtained from the ionosphere illuminated by strong HF radiation from a heating facility. The downshifted plasma line was observed during two periods when the heater operated on a frequency lower than critical. The plasma line was never observed earlier than 5 to 20 sec after heater turn-on and the intensity was very variable in time. Plasma line scattering is thought to be caused by Langmuir waves generated by direct conversion of the heating wave due to interactions with striations built up slowly in the modified ionospheric region. Data indicate a positive correlation between occurrence of plasma line backscatter and increase in intensity of the ionospherically scattered heater wave. Author (ESA)

N84-30589# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Meteorologische Fernerkundung.

THE DFVLR CONTRAST TRANSMITTANCE MODEL SCOTRAN-PROGRAM SYSTEM: DESCRIPTION AND OPERATING INSTRUCTION

Ruediger H. Buell Mar. 1984 107 p refs
(DFVLR-FB-84-18) Avail: NTIS HC A06/MF A01; DFVLR; Cologne DM 31.50

The SCOTRAN atmospheric contrast transmittance computer program system is presented. It covers the computer code for the model SCOTRAN that solves the problem of slant transmission of contrast through the atmosphere, and works in the solar spectral region and primarily in the lower atmosphere. Coding, handling, storage and execution time requirements are outlined. The version CIE 02 readily coded and suitable for the pure visible domain is introduced. It is shown that SCOTRAN can solve any radiation tasks in the solar spectral region. Author (ESA)

N84-30590# National Academy of Sciences - National Research Council, Washington, D. C.

DEBRIS FLOWS, LANDSLIDES, AND FLOODS IN THE SAN FRANCISCO BAY REGION, JANUARY 1982: OVERVIEW AND SUMMARY OF A CONFERENCE

1984 100 p refs Conf. held in Stanford, Calif., 23-26 Aug. 1982 Sponsored in cooperation with Geological Survey
(Grants NSF PFR-78-10631; NSF CEE-82-19358)
(PB84-194737; CETS/CND-027) Avail: NTIS HC A05/MF A01 CSCL 08G

The storms of January 1982 in Northern California tested a rapidly urbanizing area, the San Francisco Bay region, and several sections were found unexpectedly vulnerable to ground failure and flooding. To document this experience as a guide to future research and mitigation efforts, several agencies, professional organizations, and university departments joined with the National Research Council's Committee on Natural Diasters and the U.S. Geological Survey's Branch of Engineering Geology and Tectonics in organizing a conference on the storm in August 1982 at Stanford University and in preparing the proceedings of the conference. This publication presents an overview and summary of the conference proceedings and three invited summary papers -- on slope failures; preparedness, response, and recovery; and land use planning -- by specialists who participated in the conference. GRA

N84-30591# Geological Survey, Menlo Park, Calif.

MULAP4: A MULTI-LINEAR ANALYSIS PROGRAM FOR GROUND MOTION STUDIES OF HORIZONTALLY LAYERED SYSTEMS

Albert T. F. Chen Mar. 1984 46 p
(PB84-182815; USGS-GD-84-002) Avail: NTIS HC A03/MF A01 CSCL 08K

A computer program that analyzes the nonlinear, seismic response of horizontally layered systems is presented, in comparisons with previous multilinear analysis program versions, the present program has the additional feature of incorporating an energy transmitting boundary. Organizational features and various options of the program are described. The use of the program is illustrated. FORTRAN listing and sample input/output are also included. Author (GRA)

N84-30592# National Center for Atmospheric Research, Boulder, Colo.

ATMOSPHERIC CHEMISTRY OF H2O2, NO3, HONO, AND HNO3: INFLUENCE OF AQUEOUS PHASE AND HETEROGENEOUS PROCESSES Ph.D. Thesis - Michigan Univ.

Brian Glenn Heikes 1984 228 p refs Sponsored in part by NSF

(PB84-183680; NCAR/CT-78) Avail: NTIS HC A11/MF A01 CSCL 04A

Aqueous phase and heterogeneous processes related to the production of H_2SO_4 and HNO_3 in the atmosphere are investigated. The transformation of SO_2 by gas phase reactions is slow, and aqueous reactions between dissolved SO_2 and O_3 or H_2O_2 are thought to account for much of the sulfate in precipitation. At the low pH values of cloud water and precipitation, only H_2O_2 reactions are viable. However, this reactant may be limited in the troposphere. Consequently, a direct O_3-H_2O source of H_2O_2 in the atmosphere is negligible. The conversion of nitrogen oxides, on the other hand, is slow in aqueous solution due to the low solubility of the HNO_3 precursors at normal atmospheric conditions. Heterogeneous reactions between trace nitrogen oxides, NO_3, N_2O_4, and N_2O_5, are possible and would result in a rapid generation of HNO_3 in cloud. A model sensitivity study is performed and demonstrates that under moderately polluted conditions these reactions are capable of producing nitrate at rates comparable to those observed in stratus clouds. GRA

N84-30593# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Chemistry and Aeronomy Div.
MONTHLY MEAN DETERMINATION OF THE SOLAR SEMIDIURNAL SURFACE PRESSURE OSCILLATION AT BATAVIA FROM 1866 THROUGH 1944
Rolando R. Garcia and Kevin Hamilton (British Columbia Univ.) Apr. 1984 27 p refs Sponsored by NSF
(PB84-184795; NCAR/TN-231) Avail: NTIS HC A03/MF A01 CSCL 04A

In order to study temporal variations in the solar tides, it is necessary to have long records of surface pressure measured several times a day. One of the longest such records available is that of hourly barometric observations made at Batavia (now Djakarta; 6.18 degrees S, 106.83 degrees E) between 1866 and 1944 by the Dutch Royal Magnetic and Meteorological Observatory. In this report, a table is presented which gives the monthly mean determinations of the solar semidiurnal surface pressure oscillation at Batavia for each month from January 1866 through December 1944. GRA

N84-30413*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PRELIMINARY GEOLOGIC/SPECTRAL ANALYSIS OF LANDSAT-4 THEMATIC MAPPER DATA, WIND RIVER/BIGHORN BASIN AREA, WYOMING Abstract Only
Harold R. Lang, James E. Conel, and Earnest D. Paylor *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 109-110 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08G

N84-30441*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TROPOSPHERIC CHEMISTRY
Volker Mohnen *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A24-A27 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

N84-30442*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEOLOGY
Raymond Arvidson *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A28-A30 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08G

N84-30443*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERIOR OF THE EARTH
Roger J. Phillips *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A31-A33 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08G

N84-30447*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TROPOSPHERIC SCIENCE
Conway B. Leovy *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A44-A48 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

N84-30448*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MIDDLE ATMOSPHERIC SCIENCE
John C. Gille *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A49-A52 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

N84-30449*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AERONOMY
Paul Hays *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A53-A55 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 04A

N84-30456*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
UPDATE: SAN ANDREAS FAULT EXPERIMENT
Demosthenes C. Christodoulidis and David E. Smith *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08G

N84-30457*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CRUSTAL DEFORMATION AND EARTHQUAKES
Steve C. Cohen *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08K

N84-30460*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEODYNAMICS OF CRUSTAL DEFORMATION AND SEISMOTECTONIC BLOCK MOVEMENTS IN CENTRAL EUROPE
Han-Shou Liu *In its* Res. Activities of the Geodyn. Branch Jun. 1984 8 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08K

N84-30462*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ANALYSIS OF THE EARTH'S VARIABLE ROTATION
B. Fong Chao *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08E

N84-30463*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEASAT OBSERVATIONS OF LITHOSPHERIC FLEXURE
David C. McAdoo *In its* Res. Activities of the Geodyn. Branch Jun. 1984 7 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08G

N84-30464*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAGEOS ORBIT AND THE ALBEDO PROBLEM
David P. Rubincam *In its* Res. Activities of the Geodyn. Branch Jun. 1984 2 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 04A

N84-30482# Joint Publications Research Service, Arlington, Va.
SPATIAL DISTRIBUTION OF ADVECTIVE HEAT INFLUXES IN ATMOSPHERE OVER NORTHERN HEMISPHERE AND ITS

RELATIONSHIP TO HEAT INFLUXES FROM OCEAN Abstract only
S. E. Rakshnya *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 44-45 refs Transl. into ENGLISH from Okeanol. (Moscow), vol. 24, no. 2 Mar. - Apr. 1984 p 258-262 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30483# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF CRUSTAL STRUCTURE OF EASTERN PACIFIC OCEAN ON ITS AGE Abstract only
P. N. Kuzmin and P. P. Shirshov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 46 refs Transl. into ENGLISH from Okeanol. (Moscow), vol. 24, no. 2, Mar. - Apr. 1984 p 295-301 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30485# Joint Publications Research Service, Arlington, Va.
DEVELOPMENTS OF RESEARCH ON PREDICTION OF EARTHQUAKES, TSUNAMI AND VOLCANIC ERUPTIONS IN FAR EAST Abstract only
In its USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 62-63 refs Transl. into ENGLISH from Vestn. Akad. Nauk SSSR (Moscow), no. 2, Feb. 1984 p 3-9 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30487# Joint Publications Research Service, Arlington, Va.
CHANGES IN EARTH'S ROTATION RATE CAUSED BY ZONAL TIDE AND THEIR MANIFESTATIONS IN ATMOSPHERIC PRESSURE FIELD Abstract only
F. I. Rudyayev *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 66 refs Transl. into ENGLISH from Izv. Vseoyuznogo Geograf. Obshcestva (Leningrad), v. 116, no. 2, Mar. - Apr. 1984 p 120-126 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30488# Joint Publications Research Service, Arlington, Va.
QUASI-TWO-DAY VARIATION OF LOWER THERMOSPHERE WIND VELOCITIES Abstract only
O. V. Kaydalov, N. A. Makarov, and Yu. I. Portnyagin *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 67 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 227-233 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N84-30594 Institut Royal Meteorologique de Belgique, Brussels.
PUBLICATIONS
1984 43 p refs In FRENCH and DUTCH
Avail: Issuing Activity

This Bibliography lists over 500 publications on various meteorological topics. Author (ESA)

N84-30595*# Massachusetts Inst. of Tech., Cambridge. Dept. of Earth, Atmospheric and Planetary Sciences.
MECHANISMS OF INTERANNUAL OCEAN-ATMOSPHERE INTERACTIONS Final Technical Report
Claude Frankignoul 1984 5 p
(Grant NAG5-137)
(NASA-CR-173834; NAS 1.26:173834) Avail: NTIS HC A02/MF A01 CSCL 04B

Results of an investigation to study the interaction between ocean and atmosphere on the annual to decadal time scale are reported. Separate studies of the ocean response to atmospheric forcing, and of atmospheric response to ocean forcing were also conducted. The main findings are the dynamics of sea surface temperature anomalies, the role of short time scale weather fluctuations in the seasonal cycle of the upper ocean variability, and the planetary wave response to sea surface temperature anomalies. A numerical model of the ocean atmosphere continent system and a two layer quasi-geostropic ocean model is discussed. E.R.

N84-30596# Colorado State Univ., Fort Collins. Dept. of Mathematics.
[STUDIES OF CHEBYSHEV SPECTRAL METHODS AND MULTIGRID METHODS] Annual Report
W. H. Schubert and G. D. Taylor 8 Feb. 1984 6 p
(Contract N00014-83-K-0068)
(AD-A142014) Avail: NTIS HC A02/MF A01 CSCL 04/2

Boundary layers in the atmosphere and ocean often take on the structure of mixed layers bounded by narrow, highly stable regions. Simulation of the movement of such stable regions is a challenging task for the numerical modeler. Here we explore the use of Chebyshev spectral methods. We compare the results of spectral and finite difference methods for a simple one-dimensional test problem with known analytic solution. The results indicate the usefulness of the spectral method in obtaining accurate solutions to boundary layer problems. GRA

N84-30597# University Coll., Galway (Ireland). Dept. of Physics.
ELECTRO-OPTICAL TRANSMISSION AND LIQUID WATER CONTENT OF FOGS AND CLOUDS Interim Report, Dec. 1983 - May 1984
S. G. Jennings May 1984 13 p
(Contract DAJA37-81-C-0003; DA Proj. 1T1-61102-BH-57)
(AD-A142294; IR-10) Avail: NTIS HC A02/MF A01 CSCL 04/2

Relatively good agreement (generally within 20%) was found between two direct filtration methods, one of which employed a top loading balance. The use of a reference impaction assembly is imperative when making absolute measurements of liquid water content. The experimental assembly designed to measure simultaneously extinction coefficient and liquid water content has been completed and used. Simultaneous measurements of extinction coefficient, wavelength, and liquid water content have been successfully made, and do not closely match theoretical predictions. A new device for measuring the homogeneity of clouds in a cloud chamber has been developed. Author (GRA)

N84-30598# Airborne Research Associates, Weston, Mass.
METEOROLOGICAL RESEARCH AND SUPPORT FOR THE MIZEX (MARGINAL ICE ZONE EXPERIMENT) PROGRAM Final Report
R. Markson 4 Apr. 1984 71 p
(Contract N00014-83-C-0088)
(AD-A142409) Avail: NTIS HC A04/MF A01 CSCL 04/2

This report will discuss the measurements and ice photography obtained from the Beechcraft Baron atmospheric research aircraft operated by Airborne Research Associates (ARA) during the 1983 Marginal Ice Zone Experiment (MIZEX-83). The aircraft was instrumented to measure the bulk meteorological parameters, turbulence, surface fluxes (inferred), sea surface temperature the atmospheric electric field and conductivity. In addition, photography was obtained including the only photomosaic in MIZEX-83 and several transects which were made in color. Eleven flights were conducted from the Longyearbyen airport; one was for the mosaic and the others were for meteorology. The flight program was successful both in obtaining a 40 km x 40 km photomosaic of the region studied by the remote sensing aircraft on 11 July and in obtaining good quality meteorological data almost all the time. All flights were accomplished despite the fog, low ceilings and minimal visibility because it was possible to operate just above the ice/ocean surface. The meteorological measurements were mostly concerned with the evolution of the planetary boundary layer under conditions of on-ice and off-ice winds. Measurements were made using horizontal and vertical profile flight patterns. GRA

N84-30599# Systems and Applied Sciences Corp., Vienna, Va.
OBJECTIVE ANALYSIS AND PREDICTION TECHNIQUES, 1983 Report, 1 Dec. 1982 - 30 Nov. 1983
A. M. Gerlach Hanscom AFB, Mass. AFGL 30 Nov. 1983 220 p
(Contract F19628-82-C-0023)
(AD-A142441; AFGL-TR-83-0333; SR-3) Avail: NTIS HC A10/MF A01 CSCL 04/2

This report summarizes weather research conducted in several technical areas: in numerical weather prediction, development of a multivariate, global statistical of analysis system, generalization of the Machenbauer initialization method, objective analysis with Hough vectors; in mesoscale forecasting error analysis of LFM-II forecasts, development of forecast guidance and enhanced manually digitized radar (MDR) displays; in boundary layer meteorology, specialized computer programs for studies of wind shear, atmospheric attenuation effects on remote sensing, atmospheric chemical dispersion modeling, fog modeling, microwave refractive structure determination; in radar meteorology, study of single-Doppler detection of synoptic-scale wind, relative storm motions, detection of gust fronts, sub-storm scale motions, development of mesocyclone detection and classification algorithm, construction of CO2 Doppler lidar; in satellite meteorology, development of VAS data processing software, implementation on McIDAS of Air Force operational nephanalysis, study correlating MDR data with satellite imagery, development of microprocessor-based satellite data ingest system, maintenance and operation of AFGL McIDAS. Author (GRA)

N84-30600# Air Force Geophysics Lab., Hanscom AFB, Mass.
PREDICTION OF SLANT WIND SHEAR WITH AN OFFSET TOWER OBSERVATION SYSTEM Environmental Research Papers
H. A. Brown 23 Nov. 1983 31 p
(AF Proj. 6670)
(AD-A142676; AFGL-TR-83-0306; AFGL-ERP-861) Avail: NTIS HC A03/MF A01 CSCL 04/2

Analysis of remote tower measurements of wind speed collected at the AFGL Weather Test Facility at Otis AFB, Massachusetts, demonstrated the accuracy of an offset tower system to predict the Slant Wind Shear (SWS) over a runway. The study of wind shear has been one of a continuing program of observing and short-range prediction capabilities to meet future Air Force requirements. The objective was to evaluate the relative effectiveness of two statistically-based approaches (extrapolation and screening-regression-determined equations) using offset tower data in predicting SWS speed for intervals of 0, 5, 10, 15, 30 and 60 min at two levels of severity. A surface-based runway wind observation system was used as a comparative measure. GRA

N84-30601# Air Force Geophysics Lab., Hanscom AFB, Mass.
AN ASSESSMENT OF INTERACTIVE GRAPHICS PROCESSING IN SHORT-RANGE TERMINAL WEATHER FORECASTING Final Report
D. A. Chisholm and A. J. Jackson 18 Jan. 1984 86 p
(AF Proj. 6670)
(AD-A142706; AFGL-TR-84-0029; AFGL-ERP-868) Avail: NTIS HC A05/MF A01 CSCL 04/2

The products judged most useful in preparing short-range terminal forecasts included: (1) conventional geographic data displays presented simultaneously as four quadrant panels on one screen, (2) regional scale surface analyses, plots and data listings of basic variables, (3) satellite-based trajectory technique, (4) tailored plot displays such as the station-model time-series display, and (5) mapped displays of forecast guidance derived from the NMC LFM model. The importance of half-hourly visible and IR imagery from GOES in short-range terminal forecasting was confirmed in this experiment. The forecasters relied more heavily on it to prepare their forecasts than any other data source. The manipulation of digital imagery in a computer-based interactive graphics system through time-series looping, color enhancements, and overlaying conventional plots and analyses on it, provides a wealth of qualitative and quantitative guidance for fore-casting. The numerical forecasts yielded superior rmses compared to persistence for all forecast intervals and for each forecast element. Probability forecasts were substantially better than persistence probability and sample climatology. GEM showed skill relative to persistence probability but yielded larger rmses than did persistence in its numerical form. MOS guidance was found to be useful for forecast intervals of 4 hr or longer. GRA

N84-30602# Sandia Labs., Albuquerque, N. Mex.
COMPARISON OF LIGHTNING FLASH RATES FROM THE PBE SENSOR AND STREAK COUNTING FROM THE DMSP SATELLITE
B. N. Turman 1984 3 p refs Presented at 7th Conf. on Atmospheric Elec., Albany, 4 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-006722; SAND-83-2233C; CONF-840668-1) Avail: NTIS HC A02/MF A01

Lightning trigger rates from the PRE sensor and streaks recorded by the accompanying optical scanners were compared. The comparison provides a calibration between these two lightning detection techniques. The areal sensitivity of the optical scanner for lightning detection (2.6 x 10(4) km(2) is inferred from this calibration. Lightning flash density are calculated from equations 9 and 10, and global flash densities were calculated for dawn, dusk, and midnight for September to November 1977. The global flash rate was estimated to be about 50 s(-1). Lightning observations from a low altitude satellite are very limited. The measurements give a rough estimate of lightning flash density, averaged over large areas and long times. A more sophisticated lightning detector on a geosynchronous satellite platform is required for full time monitoring of lightning activity to generate more accurate flash density data. DOE

N84-30603# National Weather Service, Kansas City, Mo. Central Region Headquarters.
CLIMATOLOGICAL SUMMARY PROGRAMS F6 AND CLIMAT
Thomas F. Schwein Apr. 1984 56 p
(PB84-185941; NOAA-NWS-CRCP-14; NOAA-84043011) Avail: NTIS HC A04/MF A01 CSCL 04B

F6 and CLIMAT are climatological summary programs that store daily climatological data and prepare monthly summaries. These programs are described in the report. There are 3 primary data files used to store climatological information. These files contain the station name, an option map and monthly normals of temperature, and both heating and cooling degree days. This file is broken into sections each of which contains the climatology for a different type of data. This file contains all of the observed climatological data for an entire year. GRA

N84-30604# Pacific Northwest Lab., Richland, Wash.
IDENTIFICATION AND PRELIMINARY CHARACTERIZATION OF GLOBAL WATER RESOURCE ISSUES WHICH MAY BE AFFECTED BY CO2-INDUCED CLIMATE CHANGE
J. M. Callaway, M. L. Cohen, and J. W. Currie Apr. 1984 234 p refs
(Contract DE-AC06-76RL-01830)
(DE84-011127; PNL-4709) Avail: NTIS HC A11/MF A01

Identification, characterization, and definition of existing or projected regional and global water resource management issues which may be affected by CO2 induced climate changes was undertaken. Research priorities for acquiring additional information about the potential effects of a C2 induced climate change on the availability and allocation of freshwater supplies were developed. The research consisted of four work elements: (1) identification of water resource management issues on a global and regional basis; (2) identification of a subset of generic CO2 related water resource management issues are believed to have the highest probability to be affected, beneficially or adversely, by a CO2 induced climate change; (3) selection of specific sites for examining the potential effect of a CO2 induced climate change on these issues; and (4) conducting detailed case studies at these sites, the results of which will be used to identify future research and data needs in the area of water resources. The research related to the first three work elements is reported. DOE

N84-30605# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SUNLIGHT PROBABILITY DATA FOR SELECT CITIES IN THE US
Claude L. Robbins and Kerri C. Hunter Aug. 1983 192 p refs
(Contract EG-77-C-01-4042)
(DE84-000006; SERI/TR-254-1687) Avail: NTIS HC A09/MF A01

Sunlight probability data are useful in the design and analysis of daylighting systems since many systems perform differently under clear or overcast sky conditions. Sunlight probability is measured at many of the weather stations in the Typical Meteorological Year (TMY) and Estimated Typical Meteorological Year (ETMY) networks. The weather service makes this data available in the form of monthly and annual average percent Sun. However, for many design situations, hourly sunlight probability data rather than monthly and annual averages are needed. This report presents a model that was developed to establish the computed probability of having sunlight in a given hour or for a specific duration of time for select cities in the United States. DOE

N84-30606# Olson (Richard E.), Colby, Kans.
ON-SITE ANALYSIS TO ASSESS THE FEASIBILITY OF WIND POWER
Richard E. Olson 1984 80 p
(Contract DE-FG47-81R7-01219)
(DE84-009762; DOE/R7-01219/T1) Avail: NTIS HC A05/MF A01

Due to the lack of appropriate wind data in the rural environs of northwest Kansas, a mobile on-site analysis unit to assess the feasibility of wind power was proposed and subsequently constructed. The trailer, with a 45' telescoping tower, is equipped with an recording anemometer and windvane. The mobile unit consists of a two wheeled, steel trailer with mounting hardware to support the 45' tower. Guy wires are necessary, at all heights, to withstand the high wind gusts often encountered on the Great Plains. When a complete alternative energy analysis is desired, a weather shelter is available to be mounted on the trailer to house the additional monitoring instruments. DOE

N84-30607# Los Alamos Scientific Lab., N. Mex.
SOME PHYSICAL CONCEPTS IN COMPLEX TERRAIN METEOROLOGY DERIVED FROM THE DEPARTMENT OF ENERGY'S ASCOT PROGRAM
W. E. Clements 24 Mar. 1984 44 p refs Presented at Intern. Symp. on the Qinghai-Xizang Plateau and Mt. Meterol., Beijing, 20 Mar. 1984
(Contract W-7405-eng-36)
(DE84-010059; LA-UR-84-808; CONF-8403118-1) Avail: NTIS HC A03/MF A01

Since 1978 the United States Department of Energy's Atmospheric Studies in Complex Terrain program has conducted research fundamental to a better understanding of atmospheric transport and diffusion in complex topographies. Expertise in atmospheric physics theory, computer modeling, laboratory modeling, and field experimentation have been integrated into a balanced program. The initial emphases of the research were on nocturnal drainage winds, the effect terrain has on them, and their interactions with external flows. Highlights of some physical concepts of nocturnal drainage winds, derived from the results of the field experiments, are presented. DOE

N84-30608# California Univ., Livermore. Lawrence Livermore Lab.
NATURAL PHENOMENA HAZARDS MODELING PROJECT: EXTREME WIND-TORNADO HAZARD MODELS FOR DEPARTMENT OF ENERGY SITES
D. W. Coats Feb. 1984 74 p refs
(Contract W-7405-eng-48)
(DE84-011157; UCRL-53526) Avail: NTIS HC A04/MF A01

Lawrence Livermore National Laboratory (LLNL) has developed wind hazard models for the Office of Nuclear Safety (ONS), Department of Energy (DOE). The work is part of a three phase effort aimed at establishing uniform building design criteria for seismic and wind hazards at DOE sites throughout the United States. In Phase 1, LLNL gathered information on the sites and their critical facilities, including nuclear reactors, fuel reprocessing plants, high level waste storage and treatment facilities, and special nuclear material facilities. In Phase 2, development of seismic and wind hazard models, was initiated. These hazard models express the annual probability that the site will experience an earthquake on wind speed greater than some specified magnitude. This report summarizes the final wind/tornado hazard models recommended for each site and the methodology used to develop these models. DOE

N84-30609# California Univ., Berkeley. Lawrence Berkeley Lab. Windows and Daylighting Group.
DAYLIGHT AVAILABILITY AS A FUNCTION OF ATMOSPHERIC CONDITIONS
Eliyahu Neeman (Technion-Israel Inst. of Technology, Haifa) and Stephen Selkowitz Jul. 1983 8 p refs Presented at the 5th Conf. on Atmospheric Radiation, Baltimore, 31 Oct. - 4 Nov. 1983
(Contract DE-AC03-76SF-00098)
(DE84-007973; LBL-16425; CONF-831069-5) Avail: NTIS HC A02/MF A01

The differences between thermal and daylightning considerations for building design and their implications for using illuminance and irradiance data are examined. Old and new mathematical models for luminance distribution and illuminance calculation are explained. Overcast, clear, and average sky conditions are discussed and their dependence on atmospheric factors is examined. The focus is on the turbidity of the clear atmosphere and the luminance at the zenith. More measured daylighting data are required for validating the equations that are developed separately in various parts of the world. DOE

N84-30610# Washington Univ., Seattle. Quaternary Research Center.
VEGETATION AND CLIMATES OF THE LAST 45,000 YEARS IN THE VICINITY OF THE NEVADA TEST SITE, SOUTH-CENTRAL NEVADA
W. Geoffrey Spaulding 1983 210 p
(Contract DE-AI08-78ET-44802)
(DE84-009032; USGS-OFR-83-535) Avail: NTIS HC A10/MF A01

A site in or near the Nevada Test Site in south-central Nevada is being evaluated as a permanent repository for both transuranic contaminated and high level radioactive wastes. This study characterizes long term climatic variability inherent to this area. Specifically, paleoenvironmental and paleoclimatic reconstructions spanning the last 45,000 years are offered to facilitate calculations of potential variations in water table levels and gound water recharge. Radiocarbon dated plant macrofossil assemblages from ancient packrat (Neotoma spp.) middens in the Nevada Test Site and vicinity provide data for these paleoclimatic reconstructions. The uniformitarian assumption is made that climates of the last 45,000 years approximate the climates that will occur in the next 100,000 years. DOE

N84-30611# State Univ. of New York, Albany.
MODIFICATION OF THE SURFACE TEMPERATURE BY AN ARTIFICIAL CIRRUS CLOUD Final Report, 1 Sep. 1980 - 30 Nov. 1983
P. Chylek and B. Vonnegut Dec. 1983 15 p refs
(Contract DE-AC02-80ER-10691)
(DE84-011387; DOE/ER-10691/T1) Avail: NTIS HC A02/MF A01

Clouds may be stimulated to form artificially to modify the diurnal variation of temperature near the ground. Cloudiness can be created or increased by dispersing ice-nucleating agents in clear, ice supersaturated regions of the atmosphere (clear air seeding). The clouds produced by operational clear air seeding will have a significant impact on the radiation balance near the ground. The opportunities each winter for clear air seeding are estimated at 7 periods of several hour duration at any single location in the northeastern United States. During winter nights, clear air seeding to reduce residential heating requirements is economically worthwhile in densely populated areas of the northeastern United States. Based on estimates of the occurrence of clear, ice supersaturated air in the upper troposphere only, opportunities for clear air seeding in daytime to reduce air conditioning expense occurs several times a month. DOE

N84-30612# Pacific Northwest Lab., Richland, Wash.
WORLDWIDE ENERGY RESOURCE DISTRIBUTION ESTIMATES
1984 15 p
(Contract DE-AC06-76RL-01830)
(DE84-012216; DOE/RL-01830/T17) Avail: NTIS HC A02/MF A01

A map which is a preliminary estimate of the annual mean wind energy available at typical well exposed locations throughout the world is presented. The average energy in the wind flowing in the layer near the ground is expressed as a wind energy class. The greater the average wind energy, the higher the wind energy class, and the darker the shade of blue on the map. The colors corresponding to classes of wind energy are defined in the table at the upper right. DOE

N84-30613# Pacific Northwest Lab., Richland, Wash.
US AVERAGE WIND POWER BY SEASON
1984 12 p
(Contract DE-AC06-76RL-01830)
(DE84-012214; DOE/RL-01830/T16) Avail: NTIS HC A02/MF A01

The wind resource maps are based on a synthesis of 12 regional assessments covering the United States and its territories. The four seasons are defined as: Winter - December, January, and February; Spring - March, April, and May; Summer - June, July, and August; Autumn - September, October, and November. A map of the annual average wind resource is also available. For earth region, wind resource, assessments are presented in the form of an atlas. The atlases depict in graphic, tabular, and narrative form the wind resource on a regional and state level. DOE

N84-30614# World Meteorological Organization, Geneva (Switzerland).
[WORLD METEOROLOGICAL ACTIVITIES REPORT] Annual Report, 1983
1984 216 p refs
(WMO-628; ISSN-92-63-10628-2) Avail: NTIS HC A01; print copy available from WMO, Geneva

Activities of World Weather Watch, the meteorological applications and environment program, GARP, the world climate program, and the hydrology, water resources, education, and technical cooperation programs are described. External relations and legal matters are discussed. Author (ESA)

N84-30615# Intermountain Forest and Range Experiment Station, Ogden, Utah.
WEATHER SUMMARIES FOR CORAM EXPERIMENTAL FOREST, NORTHWESTERN MONTANA: AN INTERNATIONAL BIOSPHERE RESERVE
Roger D. Hungerford and Joyce A. Schlieter Mar. 1984 40 p refs
(PB84-182443; FSGTR/INT-160) Avail: NTIS HC A03/MF A01 CSCL 02F

The report presents weather data summaries (1934-82) for most of the weather stations within the Coram Experimental Forest (a Biosphere Reserve) in northwestern Montana and for three stations adjacent to the Forest. These data aid in the interpretation of silvicultural and other biological research, particularly the relationships of climatological variations to forest growth and productivity. GRA

N84-30616# National Weather Service, Garden City, N.Y. Scientific Services Div.
ZONES
Gerald G. Rigdon Mar. 1984 47 p
(PB84-174325; NOAA-NWS-ERCP-17; NOAA-84032301) Avail: NTIS HC A03/MF A01 CSCL 04B

ZONES takes a zone forecast workbin and returns properly formatted zone forecast products to the AFOS database. This program can be used for a single set of zones or up to three sets of zones split up from one workbin. When producing multiple sets of zones, the first set of zones can have zone numbers from 1 to 49, the second and third sets can only have zone numbers from 1 to 9. GRA

N84-30617# National Weather Service, Garden City, N.Y. Scientific Services Div.
AUTOMATED ANALYSIS OF UPPER AIR SOUNDINGS TO SPECIFY PRECIPITATION TYPE
Joseph R. Bocchieri and Gerald G. Rigdon Mar. 1984 23 p refs
(PB84-174333; NOAA-NWS-ERCP-18; NOAA-84032302) Avail: NTIS HC A02/MF A01 CSCL 04B

The vertical temperature and moisture structure of the atmosphere, as obtained from the radiosonde observation (RAOB), is an important consideration for short-range forecasts of precipitation type. This computer program automatically analyzes a RAOB and computes a number of variables which have been found to be important in discriminating between liquid, freezing, and frozen precipitation. GRA

N84-30618# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
PROGRAM FOR REGIONAL OBSERVING AND FORECASTING SERVICES (PROFS) Annual Report, 1 Oct. 1982 - 30 Sep. 1983
Jan. 1984 32 p refs
(PB84-179928; NOAA-84041305) Avail: NTIS HC A03/MF A01 CSCL 04B

The Program for Regional Observing and Forecasting Services (PROFS) enjoyed its fourth year as a NOAA organization in FY83. It was initiated in FY80 as a part of the Environmental Research Laboratories. The mission of the PROFS program is to improve short-range operational weather services by the development, testing, and transfer of scientific and technologies advances. Since its mission relates to both the research and operational sides of NOAA, PROFS has received guidance from a Troika, consisting of the Directors of the National Weather Service (NWS), National Environmental Satellite, Data, and Information Service (NESDIS), and Environmental Research Laboratories (ERL). Author (GRA)

N84-30619# National Hurricane Center, Coral Gables, Fla.
NATIONAL WEATHER SERVICE HURRICANE PROBABILITY PROGRAM
R. C. Sheets Apr. 1984 78 p refs
(PB84-182757; NOAA/TR-NWS-37; NOAA-84041901) Avail: NTIS HC A05/MF A01 CSCL 04B

Possible approaches to the problem of hurricane landfall prediction are examined. The background and basis for hurricane probabilities are presented. Illustrations of probability determination are provided along with their interpretations and use. GRA

N84-30620# Illinois State Water Survey, Champaign.
STUDIES OF STATISTICAL TECHNIQUES TO EVALUATE WEATHER MODIFICATION. VOLUME 1: REPORTS OF OSET Final Report
Chin-Fei Hsu, Floyd A. Huff, Stanley A. Changnon, Jr., and Robert W. Scott Mar. 1984 131 p refs
(Grant NSF ATM-81-07027)
(PB84-182906; ISWS/CON-340-84-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 04B

This report addresses various techniques and statistical methods for evaluating such projects. Through simulated changes in weather conditions, some of the most promising techniques are compared. It was determined that the principal component regression technique was the most powerful evaluation method under more circumstances than others. If a small increase (10% or so) of precipitation is expected, one should opt for multiresponse permutation procedures. If the expected effects of seeding are nonconstant, use of simple nonparametric tests will yield higher powers. Several operational projects were selected for testing. The use of synoptic, weather information in evaluating two large area projects, an aircraft seeding project in Kansas and an Oklahoma project using ground generators, helps delineate the seeding effects of these two programs. Author (GRA)

N84-30621# National Center for Atmospheric Research, Boulder, Colo.

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH Annual Report, 1983

Mar. 1984 97 p Sponsored by NSF
(PB84-183581; NCAR/AR-83) Avail: NTIS HC A05/MF A01 CSCL 04B

The report describes ongoing research activities and the most significant recent achievements of the Center; which is operated by 50 member organization, the University Corporation for Atmospheric Research, under the sponsorship of the National Science Foundation. A section of directories lists the scientific and technical staff, organizational structure, financial statements, visitors and publications. Abundant illustrations and photographs, and a semitechnical narrative, makes the report accessible to a wide readership of science administrators, decision makers, students, and interested laypeople. GRA

N84-30622# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

ANALYSIS OF SOME CLOUD AND FRONTAL EVENTS RECORDED DURING THE BOULDER UPSLOPE CLOUD OBSERVATION EXPERIMENT (BUCOE) OF 1982

Earl E. Gossard Mar. 1984 116 p refs
(PB84-179662; NOAA-84040302) Avail: NTIS HC A06/MF A01 CSCL 04B

This report deals mainly with the two most well defined upslope events recorded during the BUCOE experiment (Gossard, editor, 1982). The first four parts of the report describe some observations of the events of 24 March 1982 and 11-13 May 1982 as well as some supporting observations in other events. Part 5 is a meteorological analysis of the physical processes taking place in the event of 24 March, and Part 6 is a meteorological study of the case of 11-13 May using a numerical model, emphasizing especially the scavenging effectiveness of such events. GRA

N84-30623# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Sciences Group.

VARIABILITY OF THE CONVECTION FIELD PATTERN IN SOUTH FLORIDA AND ITS RELATIONSHIP TO THE SYNOPTIC FLOW

D. O. Blanchard and R. E. Lopez Jan. 1984 86 p refs
(PB84-177393; NOAA/TM-ERL-ESG-4; NOAA-84031501) Avail: NTIS HC A05/MF A01 CSCL 04B

This report contains an analysis of the sea breeze and lake breeze convergence lines and the associated convection over south Florida during the summer that may vary considerably from day to day. An examination of the daily convective patterns indicates that there are a few basic recurring patterns. Analysis of radiosonde data show significant differences in the local thermodynamic parameters, most notably the specific humidity. Changes in the synoptic scale wind field correspond closely to changes in the observed convective patterns and the local thermodynamic conditions. Explanation of the formation and development of the different patterns of convection are given in terms of the complex interaction between the regional synoptic peninsular and local scale circulations. Author (GRA)

N84-30624# Transportation Systems Center, Cambridge, Mass.

PANAMA CANAL FOG NAVIGATION STUDY: CANDIDATE SYSTEM DEFINITION

E. A. Spitzer and F. D. MacKenzie Mar. 1984 81 p refs Sponsored in part by Panama Canal Commission
(PB84-180793; DOT-TSC-RSPA-83-14) Avail: NTIS HC A05/MF A01 CSCL 13J

A candidate system for solving fog navigation problems in the Panama Canal is defined. The vessel monitoring subsystem is a shore-based, all-weather, precision ranging system with ranging accuracies of 9 feet (2 standard deviations, 95 percent). A vessel's onboard Control Pilot receives all visual cues and digital data needed for safe and efficient navigation through the Gaillard Cut. Multilateration techniques employing computer-processed precision range measurements between the vessel and each of three or more shore-based interrogator stations provide vessel location, heading and velocity information. Simultaneous capacity is 25 vessels, expandable to 43. Subsystems described include: vessel monitoring, computer, display, communications, marine traffic control, weather and training. GRA

N84-30625# Transportation Systems Center, Cambridge, Mass.

PANAMA CANAL FOG NAVIGATION STUDY: SYSTEM REQUIREMENTS STATEMENT Final Report, Jan. 1983 - Jan. 1984

F. D. MacKenzie and E. A. Spitzer Mar. 1984 50 p refs Sponsored in part by Panama Canal Commission
(PB84-179811; DOT-TSC-RSPA-83-15) Avail: NTIS HC A03/MF A01 CSCL 13J

Efforts to minimize the adverse impact of fog on Panama Canal operations focused in the past on obtaining methods of predicting fog, of dispersing fog and of providing navigation during fog. The results of the most recent fog navigation system requirements study are given. The study is based on information gathered by an on-site visit, a review of past studies conducted by the Panama Canal Commission (PCC), and interviews with the Pilot force, engineering staff, and management personnel. The canal's fog navigation problem areas are defined. The performance requirements of a fog navigation system for use by Pilots in the Gaillard Cut are given. Author (GRA)

N84-30480# Joint Publications Research Service, Arlington, Va.

INEVITABLE CLIMATIC CHANGES

M. Budyko *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 1-12 refs Transl. into ENGLISH from Znaniye - Sila (Moscow), no. 4, Apr. 1984 p 18-20, 46 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30481# Joint Publications Research Service, Arlington, Va.

RESULTS OF OCEAN-ATMOSPHERE INTERACTION STUDIES IN WEST ATLANTIC

In its USSR Repr.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 26-27 refs Transl. into ENGLISH from Komsomolskaya Pravda (Vilnius, USSR), 16 Jun. 1984 p 3 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30486# Joint Publications Research Service, Arlington, Va.

INTERPRETING THREE-DIMENSIONAL GRAVITATIONAL AND MAGNETIC ANOMALIES Abstract only

A. V. Tsirulskiy, V. I. Mayer, F. I. Nikonova, I. L. Prutkin, and N. V. Fedorova *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 65 refs Transl. into ENGLISH from Tikhookeanskaya Geol. (Novosibirsk) no. 1, Jan. - Feb. 1984 p 94-98 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30489# Joint Publications Research Service, Arlington, Va.

STABILITY CRITERION FOR MOIST COMPRESSIBLE ATMOSPHERE AND ENERGY CONDITIONS FOR DEVELOPMENT OF CONVECTIVE CLOUD COVER: NUMERICAL EXPERIMENT Abstract only

A. N. Vulfson *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 67-68 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no.

3, Mar. 1984 p 234-243 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30490# Joint Publications Research Service, Arlington, Va.
EFFECT OF ANTISCREENING OF OUTGOING THERMAL RADIATION BY CLOUD COVER Abstract only
I. I. Mokhov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 68-69 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), V. 20, no. 3, Mar. 1984 p 244-254 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

N84-30491# Joint Publications Research Service, Arlington, Va.
ACCURACY OF ONE APPROXIMATE METHOD FOR COMPUTING RADIATIVE FLUXES IN PRESENCE OF BROKEN CLOUDS Abstract only
V. N. Skorinov and G. A. Titov *In its* USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 70 refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Fiz. Atmosfery I Okeana (Moscow), v. 20, no. 3, Mar. 1984 p 263-270 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N84-30626 National Maritime Inst., Teddington (England).
WAVE FORCE INVESTIGATIONS AT THE SECOND CHRISTCHURCH BAY TOWER Summary Report, 1982
J. R. Bishop Jan. 1984 88 p refs Supported by UK Department of Energy Offshore Technology Board Original contains color illustrations
(NMI-R177; OT-O-82100) Copyright. Avail: Issuing Activity

Fluid loading on offshore structures was investigated using an instrumented tower. Particle kinematics were measured at various depths. Tidal currents were measured to calibrate predictions of current and tide height and to evolve a method of correcting the zero readings of transducers, by reference to the symmetry of velocities and current-induced forces in the tidal cycle. The investigations show that prediction methods such as linear wave theory are reliable. Author (ESA)

N84-30627# Naval Air Systems Command, Washington, D. C.
US NAVY HINDCAST SPECTRAL OCEAN WAVE MODEL CLIMATIC ATLAS: NORTH ATLANTIC OCEAN
Oct. 1983 456 p
(AD-A141810; AD-E800931; NAVAIR-50-1C-538) Avail: NTIS HC A20/MF A01 CSCL 08/3

Existing wave climatologies are primarily based on visual ship observations. These climatologies may be unreliable, particularly in data-sparse regions. Shipborne wave recorders have provided reliable wave data for selected areas of the oceans, but a scarcity of these data remains. This pilot atlas introduces a new, numerically derived, historical data set in the form of a wind and wave climatology. It is intended to provide the design, scientific and operational communities a more accurate representation of the overall wave climate of the North Atlantic Ocean than is available from other sources. GRA

N84-30628# Delaware Univ., Newark. College of Marine Studies.
PROPAGATING LONG WAVES ON OCEANIC DENSITY FRONTS: AN ANALYTIC MODEL Final Report
R. W. Garvine Apr. 1984 36 p
(Contract N00014-78-C-0071)
(AD-A141915) Avail: NTIS HC A03/MF A01 CSCL 08/10

An analytic model of long, propagating free wave perturbations to an established upper ocean density front is developed. The primary object of the model is to illuminate basic frontal wave mechanisms for possible subsequent use in more sophisticated, numerical models. The model is of the barotropic class but has ageostrophic dynamics because of the basic state adopted, essentially Stommel's (1966) model of the Gulf Stream with uniform potential vorticity and order one Rossby number. The model assumes inviscid dynamics apart from a narrow dissipative zone adjacent to the surface front. The latter exerts bulk effect on the larger inviscid zone, especially in generating small, but finite, cross-stream flow in the basic state. For zero cross-flow the resulting waves are stable, have downstream phase speeds that are slow compared to the current speed and that increase with frequency, and have anomalous dispersion. The phase speeds compare well with the analysis of observations of propagating Gulf Stream meanders by Halliwell and Mooers (1983). For finite cross-flow the waves grow slowly in the downstream direction when flow is out of the current and decay when flow is into the current. The rates of growth or decay are independent of wavelength. Corresponding net growth or decay in the wave kinetic energy is produced by action of the cross-correlation wave Reynolds stress against the lateral shear of the basic state current. GRA

N84-30629# Naval Research Lab., Washington, D. C.
THE BREAKING OF OCEAN SURFACE WAVES
O. M. Griffin 6 Jun. 1984 80 p
(AD-A142356; NRL-MR-5337) Avail: NTIS HC A05/MF A01 CSCL 08/3

There are essentially four types of breaking waves, as described by Galvin (1968) and many others. The first two types are the plunging breaker, in which the wave crest curls forward and plunges into the slope of the wave at some distance away from the crest; and the spilling breaker, in which the broken region tends to develop more gently from an instability at the crest and often forms a quasi-steady whitecap on the forward face of wave. The third type, surging, sometimes develops as waves are incident upon a sloping beach. A fourth type of breaking, collapsing, is considered by many to be special limiting case of the plunging breaker. Several advances toward an understanding of wave breaking have been made in recent years. These include the experimental characterization of the instability mechanisms which lead to wave breaking in deep water, proposed mathematical models for these instability mechanisms, and numerical simulations of wave overturning and incipient breaking. These topics are discussed here. Little is known quantitatively about the processes of air entrainment in breaking waves. However, a more complete knowledge of the air entrainment process will be required for the further development of plausible models for radar scattering from breaking waves on the ocean surface. A forecase model for the breaking of deep water waves has been proposed and a breaking critierion for use with the model has been formulated. Recent laboratory experiments to study the onset of wave breaking in deep water provide one means for quantifying this criterion in terms of a breaking coefficient. An alternate means for determining this coefficient has been proposed on the basis of stream function wave theory. These topics also are discussed here. GRA

N84-30630# Pierce (Allan D.), Marietta, Ga.
ANALYTICAL MODELING OF RANDOM THERMAL FLUCTUATIONS IN THE NORDA (NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY) HIGH-FREQUENCY SOUND SCATTERING FACILITY Final Technical Report, 1 Feb. 1983 - 31 Jan. 1984
A. D. Pierce 28 May 1984 79 p
(Contract N00014-83-C-0260)
(AD-A142520) Avail: NTIS HC A05/MF A01 CSCL 20/1

An analytical study is presented of the laminar and turbulent flow fields that result from natural convection created by cooled or heated arrays of tubular elements immersed in water. The study is concerned in particular with the methods used to create turbulence in the NORDA high-frequency sound scattering facility and many numerical results are given that pertain to that application. The report discusses the initially laminar thermal plume that rises from a line source of heat in water, the instability of this plume, the eventual turbulent form of the plume, plume-plume interactions, and the swaying of thermal plumes. An appendix gives a chronological bibliography of works on natural convection that may be pertinent to understanding of turbulent flows created in situations analogous to the NORDA high-frequency scattering facility. Author (GRA)

N84-30631# Naval Postgraduate School, Monterey, Calif.
A SYNOPTIC CASE STUDY ANALYSIS OF THE OCEAN TEMPERATURE ANOMALIES IN THE CENTRAL PACIFIC REGION, 1976 - 1979 Final Report, Oct. 1982 - Sep. 1983
R. L. Elsberry Jan. 1984 77 p
(AD-A142548; NPS63-84-003) Avail: NTIS HC A05/MF A01
CSCL 08/10

An attempt is made to trace the history of each significant ocean temperature anomaly found in the North Pacific Experiment TRANSPAC monthly analyses during 1976-79. The prime generation regions are around 170E and 145W and there is a secondary maximum near 170W. The anomalies may reach maximum amplitude at any time between the first month and the last month they are detected. Warm and cold anomalies form during all seasons, and may persist for periods of up to a year. The TRANSPAC data set provides a variety of cases that are suitable for testing ocean prediction models. Selected cases of warm and cold anomalies are described in some detail and a complete listing of the anomalies is provided in the appendices. Author (GRA)

N84-30632# Naval Postgraduate School, Monterey, Calif.
INTERANNUAL VARIABILITY IN SEA-SURFACE TEMPERATURE AT ONE LOCATION ALONG THE CENTRAL CALIFORNIA COAST
L. C. Breaker, P. A. W. Lewis, and E. J. Orav May 1984 20 p
(AD-A142553; NPS55-84-012) Avail: NTIS HC A02/MF A01
CSCL 08/10

Sea surface temperature (SST) since March 1, 1971 at Granite Canyon, just north of Pt. Sur, California, are examined for interannual variability. Each of four El Nino episodes occurring over the past 13 years can be easily detected in the raw data. Annual mean temperatures are significantly higher during the El Nino years. The 1982-83 El Nino episode was more intense than the previous episodes; temperatures were as much as 5C above normal during the episode and it lasted about 20 months. Major abrupt decreases in SST were frequently observed during the spring. These events are identified as the spring transition to coastal upwelling and appear to be most intense following El Nino episodes. Empirical Orthogonal Function analysis of the data indicates that maximum variability in SST's occurs between October and February and that it coincides with the four El Nino episodes occurring over the past 13 years. Author (GRA)

N84-30633# Environmental Research Inst. of Michigan, Ann Arbor. Radar Div.
SUMMARY OF SAR (SYNTHETIC APERTURE RADAR) OCEAN WAVE DATA ARCHIVED AT ERIM (ENVIRONMENTAL RESEARCH INSTITUTE OF MICHIGAN) Topic Report, Oct. 1982 - Apr. 1984
J. D. Lyden May 1984 122 p
(Contract N00014-81-C-0692)
(AD-A142620; ERIM-155900-17-T) Avail: NTIS HC A06/MF A01
CSCL 20/4

Synthetic aperture radar (SAR) ocean wave imagery processed, analyzed, and archived at the Environmental Research Institute of Michigan (ERIM) is summarized. This summary includes a review of the SAR systems used to collect ocean wave imagery, as well as a brief review of the experiments where SAR ocean wave data was collected. The imagery from these experiments was manually examined to qualitatively rate the detectability of waves in each pass. This information is summarized in table form, along with the SAR operating parameters and environmental conditions for each of the experiments. The data summarized in this report can be used in evaluating current and future SAR ocean wave imaging models. GRA

N84-30634# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.
DOCUMENTATION OF WAVE-HEIGHT AND TIDAL ANALYSIS PROGRAMS FOR AUTOMATED DATA ACQUISITION AND CONTROL SYSTEMS Final Report
K. A. Turner and D. L. Durham May 1984 122 p
(AD-A142679; WES/MP/HL-84-2) Avail: NTIS HC A06/MF A01
CSCL 08/3

Detailed documentation of two major programs, Wave Height and Tidal Analysis, for the Automated Data Acquisition and Control Systems (ADACS) is presented in this report. The wave-height program is used to analyze model data from hydraulic wave models and calculates various statistical parameters of wave height for specified model tests at selected locations in the model. Similarly, the Tidal Analysis program analyzes model data from hydraulic tidal models and calculates various tidal parameters for specified model tests at selected locations in the model. For each of these programs, the program functions, specifics, input (output), listing, tape formats, etc., are discussed in detail. GRA

N84-30635# North Carolina State Univ., Raleigh. Progress Report, Jun. 1982 - Dec. 1983
CONTINENTAL SHELF PROCESSES AFFECTING THE OCEANOGRAPHY OF THE SOUTH ATLANTIC BIGHT
Leonard J. Pietrafesa, comp. Dec. 1983 392 p refs
(Contract DE-AS09-76EV-00902)
(DE84-010113; DOE/EV-00902/35) Avail: NTIS
HC A17/MF A01

This is a report on the progress of continental margin oceanographic studies being conducted as a part of the overall DOE South Atlantic Bight program. The NCSU-DOE program is working towards a fundamental understanding of oceanographic processes which determine the transport pathways, residence times and ultimate fate of biological and chemical parameters in the coastal environment. Additionally, the SAB has been considered a potential area for fuel producing facilities and activities, as a medium for fuel transport and as a fuel waste receptacle. In that regard, impact upon the environment and environmental impact upon the activity can only be addressed with a more thorough assessment of the environment itself. Research activities have been directed toward the development of the bottom mounted tripod multiple input sensor system, toward the continuing analyses of South Atlantic Bight (Gabex I, Carolina Capes and Gabex II) current meter and ancillary data sets and toward the development of conceptual and theoretical models of continental margin processes and effects. DOE

N84-30636# Science Applications, Inc., Raleigh, N.C.
LONG-TERM SALINITY, TEMPERATURE AND CURRENT MEASUREMENTS IN UPPER CHESAPEAKE BAY Final Report
Peter Hamilton and William C. Boicourt (Maryland Univ., Cambridge)
Jan. 1984 120 p refs
(PB84-180280; PPSP/PPRP-87) Avail: NTIS HC A06/MF A01
CSCL 08J

The time and space variability of the salinity, temperature, and current velocity fields in the upper Chesapeake Bay were measured. The data generated by the study are presented and the phenomena observed were described. The time series data were analyzed in terms of the major forcing mechanisms: river flow, wind, and tide. Extensive use was made of spectral and time series analysis techniques including Empirocal Orthogonal Function (EOF) analysis. Conclusions and recommendations for future research using this data set are given. Author (GRA)

N84-30637# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
PRELIMINARY REPORT OF HF RADAR MEASUREMENTS OF SURFACE CURRENTS EAST OF THE STRAIT OF GIBRALTAR NEAR MARBELLA, SPAIN, 7-22 OCTOBER 1982, PART 2
Steve White and John Forberg Jan. 1984 378 p refs
(PB84-183664; NOAA-DR-ERL-WPL-4-Pt-2; NOAA-84041904-Pt-2)
Avail: NTIS HC A17/MF A01 CSCL 08C

This report is in the form of surface current vector maps. Here the results of temporal and areal filtering of the data contained in Part 1 are presented. During October 1982 the surface currents in the Alboran Sea were mapped with a high-frequency radar system. The currents were measured synoptically over several thousand square kilometers for a period of 15 days. Author (GRA)

N84-30638# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
PROCEEDINGS OF TSUNAMI SYMPOSIUM
E. N. Bernard, ed. 1983 267 p refs Symp. held in Hamburg, Aug. 1983
(PB84-183482; NOAA-84041802) Avail: NTIS HC A12/MF A01 CSCL 08C

This document represents the proceedings of the tsunami sessions. Sixteen manuscripts are included along with eight abstracts to document the scientific information presented during the Assembly. Some of the abstracts contain references to more complete published works on the subject. GRA

N84-30639# Geological Survey, Woods Hole, Mass.
ENVIRONMENTAL GEOLOGIC STUDIES ON THE UNITED STATES MID- AND NORTH ATLANTIC OUTER CONTINENTAL SHELF AREA, 1980-1982. VOLUME 1: EXECUTIVE SUMMARY Final Report
Bonnie A. McGregor, ed. 1983 55 p refs 3 Vol.
(PB84-187939; MMS/AT/ES-84/10-Vol-1) Avail: NTIS HC A04/MF A01; also available in set of 3 reports HC E99 as PB84-187921 CSCL 08J

The objectives of the geologic research program in the North and Mid-Atlantic Outer Continental Shelf regions include: (1) to document shelf-canyon, shelf-slope, and slope-canyon bottom and current processes, (2) to describe the transport mechanisms, currents, processes, and sediment properties on the Continental Slope and Rise that influence sediment and pollutant movement into and through submarine canyons, (3) to describe and map the morphology and shallow structure of the heads of Lydonia and Oceanographer Canyons and the adjacent shelf and slope, (4) to texturally characterize sediments from the axis and walls of Lydonia Canyon, (5) to assess the geotechnical properties of sediments, and (6) to define the shallow subbottom stratigraphy. GRA

N84-30640# Geological Survey, Woods Hole, Mass.
ENVIRONMENTAL GEOLOGIC STUDIES ON THE UNITED STATES MID- AND NORTH ATLANTIC OUTER CONTINENTAL SHELF AREA, 1980-1982. VOLUME 2: MID-ATLANTIC REGION Final Report
Bonnie A. McGregor, ed. 1983 367 p refs 3 Vol.
(PB84-187947; MMS/AT/ES-84/11-Vol-2) Avail: NTIS HC A16/MF A01; also available in set of 3 reports HC E99 as PB84-187921 CSCL 08J

Data acquired on 5 cruises is presented and results from the research done during the time period 1 October 1979 to 30 September 1982 for the Mid-Atlantic Outer Continental Shelf region are given. The geologic and oceanographic processes that influence sediment transport on the Continental Margin are discussed. GRA

N84-30641# Geological Survey, Woods Hole, Mass.
ENVIRONMENTAL GEOLOGIC STUDIES ON THE UNITED STATES MID-AND NORTH ATLANTIC OUTER CONTINENTIAL SHELF AREA, 1980-1982. VOLUME 3: NORTH ATLANTIC REGION Final Report
Bonnie A. McGregor, ed. 1983 348 p refs 3 Vol.
(PB84-187954; MMS/AT/ES-84/12-Vol-3) Avail: NTIS HC A15/MF A01; also available in set of 3 reports HC E99 as PB84-187921 CSCL 08J

Volume 3 presents the results of research undertaken in the North Atlantic region (Georges Bank, outer continental shelf, slope, and upper rise) by the U.S. Geological Survey from October 1979 to September 1982. Data were collected on 21 cruises and research in general focuses on an assessment of geologic and oceanographic conditions within the region. The transport of sediments on the continental margin, especially into and through submarine canyons, and the geologic and oceanographic processes that influence this transport are discussed in a series of eight technical chapters. Lydonia and Oceanographer Canyons are key field study locations. Topics include geotechnical characterizations, sediment and sand-wave movement, wind-current coupling, and bottom currents. Author (GRA)

N84-30437*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BIOLOGICAL OCEANOGRAPHY
Mark R. Abbott *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A11-A14 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08A

N84-30444*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OCEANIC TRANSPORT
Robert Chase and Lawrence McGoldrick *In its* Earth Observing System. Vol. 1, pt. 2: Sci. and Mission Requirements Aug. 1984 p A34-A36 (For primary document see N84-30433 20-42)
Avail: NTIS HC A04/MF A01 CSCL 08C

N84-30469*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OCEAN CIRCULATION STUDIES
Chester J. Koblinsky *In its* Res. Activities of the Geodyn. Branch Jun. 1984 4 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08C

N84-30470*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GLOBAL MEAN SEA SURFACE BASED UPON SEASAT ALTIMETER DATA
James G. Marsh *In its* Res. Activities of the Geodyn. Branch Jun. 1984 6 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08J

N84-30471*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN OBJECTIVE ANALYSIS TECHNIQUE FOR EXTRAPOLATING TIDAL FIELDS
Braulio V. Sanchez *In its* Res. Activities of the Geodyn. Branch Jun. 1984 8 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 08C

N84-30484# Joint Publications Research Service, Arlington, Va.
STRUCTURE OF OCEAN FLOOR IN RELATION TO CONDITIONS FOR FORMATION OF LITHOSPHERE Abstract only
In its USSR Rept.: Earth Sci. (JPRS-UES-84-006) 13 Aug. 1984 p 47-48 refs Transl. into ENGLISH from Okeanol. (Moscow), vol. 24, no. 2, Mar. - Apr. 1984 p 302-307 (For primary document see N84-30479 20-42)
Avail: NTIS HC A05/MF A01

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N84-30642# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOL. 18, NO. 3, MAY - JUNE 1984
O. G. Gazenko, ed. 3 Jul. 1984 146 p refs Transl. into ENGLISH of Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 96 p
(JPRS-USB-84-005) Avail: NTIS HC A07

The effects of the aerospace environment on human and animal systems are investigated. Topics include the physiological effects of orthostatic positioning, hyperthermia, hypokinesia, work capacity, respiration and oxygen metabolism, and weightlessness simulation studies. For individual titles, see N84-30643 through N84-30663.

N84-30643# Joint Publications Research Service, Arlington, Va.
USE OF VITAMINS DURING ADAPTATION TO HIGH ALTITUDES c52
M. S. Belakovskiy, N. G. Bogdanov, Ye. B. Gippenreyter, and A. S. Ushakov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 1-8 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 4-9 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Adaptation to a high altitude environment is accompanied by various metabolic changes. It is recommended to use essential nutrients--vitamins to optimize adaptation to this environment and to maintain adequate work capacity and good health. M.A.C.

N84-30644# Joint Publications Research Service, Arlington, Va.
RELIABILITY AND EFFICIENCY OF KUBICEK RHEOGRAPHIC METHOD FOR MONITORING CARDIAC OUTPUT AND STROKE VOLUME c52
A. M. Genin, L. S. Zingerman, D. G. Maksimov, G. Ye. Belozerov, V. P. Katuntsev, M. V. Obukhova, K. S. Yurova, G. I. Kheymets, V. A. Galichiy, and R. I. Finaogenova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 9-15 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 9-14 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Simultaneous measurements by the Fick direct method and the Kubicek rheographic method of cardiac output of 20 men with ischemic heart disease show that both methods are well correlated. The reproducibility of the Kubicek data is better than the Fick data. In order to provide the necessary accuracy of the Kubicek method, it is required that the procedure be stringent and the five variables in the formula for calculating cardiac output be precisely measured. The cardiac output values determined simultaneously by the Kubicek method and by X ray contrast ventriculography showed a better correlation. M.A.C.

N84-30645# Joint Publications Research Service, Arlington, Va.
WALKING ERECT AS A FACTOR IN DEVELOPMENT OF ARTERIAL HYPERTENSION IN PRIMATES c52
G. S. Belkaniya and V. A. Dartsmeliya *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 16-23 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 14-19 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Time course changes in the cardiovascular function of rhesus monkeys are investigated during forced orthograde statics and upright walking. Arterial pressure by Korotkoff sounds (in certain cases by a direct method in the femoral artery) and major parameters of central hemodynamics by tetrapolar thoracic rheography are measured. The monkeys develop stable arterial hypertension three months after the onset of the upright study. Hemodynamic parameters reflect circulation centralization, formation of the hyperkinetic type of the orthostatic reaction and development of arterial hypertension of the resistive type. It is suggested that orthostatics may contribute to the development of arterial hypertension. M.A.C.

N84-30646# Joint Publications Research Service, Arlington, Va.
EFFECT OF DIHYDROERGOTAMINE ON HUMAN CIRCULATION DURING ORTHOSTATIC TESTS c52
A. Yu. Modin, S. V. Abrosimov, O. D. Anashkin, V. V. Zhidkov, V. I. Lobachik, L. B. Parashin, and V. S. Shashkov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 24-28 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 19-23 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The physiological effects of zero g are simulated by 6 hour antiorthostatic hypokinesia at -13 degrees, using eight healthy volunteers. During the first study the test subjects received a placebo and during the second study they get 6 mg dihydroergotamine methane sulfonate per os. Radiometric examinations of the whole body and its compartments (head, chest, abdomen, legs) show that the drug increased blood pooling in the upper body and decreased it in the lower body at every position of the long axis of the body relative to the gravity vector. M.A.C.

N84-30647# Joint Publications Research Service, Arlington, Va.
CIRCULATORY CHANGES IN ORTHOSTATIC POSITION IN THE PRESENCE OF HYPERTHERMIA c52
V. I. Sobolevskiy and V. P. Pravosukov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 29-32 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 23-25 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Orthostatic tolerance does not deteriorate if the level of hyperthermia and weight losses are controlled. Orthostatic intolerance develops at a critical level of hyperthermia and water losses. The mechanisms of this effect are described. M.A.C.

N84-30648# Joint Publications Research Service, Arlington, Va.
BLOOD PLASMA FREE AMINO ACIDS UNDER HYPOKINETIC CONDITIONS c52
I. G. Popov and A. A. Latskevich *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 33-43 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 25-34 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The study of 17 free amino acids in plasma of six healthy men under ambulatory and hypokinetic conditions demonstrates that by day 15 of clinostatic hypokinesia the content of most amino acids increases and by day 30 decreases reaching the pretest level or falling below it. These variations in the amino acid concentration are viewed as a consequence of the modified relations between anabolic and catabolic processes induced by adaptation to hypokinesia. It is emphasized that the nutrition pattern was different in the hypokinetic study. M.A.C.

N84-30649# Joint Publications Research Service, Arlington, Va.
HUMAN STOMACH MOTOR AND EVACUATORY FUNCTIONS DURING ANTIORTHOSTATIC HYPOKINESIA c52
K. V. Smirnov, A. N. Petrusenko, and A. P. Menshchikov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 44-49 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 34-38 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

After overnight fasting test subjects exposed to head down tilt show an increase in the amplitude of stomach biopotentials, thus suggesting an increase in its contractile force. A provocative food test demonstrates an increase in the excitability of the stomach neuromuscular apparatus due to 30 day head down tilt, which includes an increment of contraction amplitudes and rates. An analysis of the wave amplitude composition shows a shift to the right which is most distinct in the fasting state. Stomach motor activity in the digestive period shows a greater resistance to head down tilt. An increase in the asymmetry coefficient before and after food intake proportional to the head down tilt duration suggests that the stomach evacuatory activity is inhibited. M.A.C.

N84-30650# Joint Publications Research Service, Arlington, Va.
CIRCADIAN PATTERN OF SIMIAN FUNCTIONAL PARAMETERS DURING HYPOKINESIA AND IN THE RECOVERY PERIOD c52
N. F. Kolpakova and T. G. Urmancheyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984

(JPRS-USB-84-005) 3 Jul. 1984 p 50-57 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 38-43 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Seven male rhesus monkeys, aged 3.5 to 4 years, were examined during clinostatic hypokinesia for 20 to 40 days and after exposure for 16 days. Parameters of the cardiovascular function, external respiration and body temperature were measured. During and after hypokinesia the amplitude of diurnal variations of heart rate tended to decrease. The position of heart rate acrophases shifted most during the first three weeks of hypokinesia and during recovery. Changes in the amplitude of diurnal variations of arterial pressure were different. The position of acrophases on the time axis was unstable and tended to recover by hypokinesia days 30 to 40 and then shifted again on the 1st recovery day. The amplitude of diurnal variations of the respiration rate increased, the position of acrophases on the time axis shifted and their width changed. By the 14th day of readaptation the diurnal dynamics of this parameter tended to recover. During hypokinesia the amplitude of diurnal variations of body temperature increased or decreased and the position of acrophases on the time axis remained stable. M.G.

N84-30651# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF RED BLOOD CELL CHANGES IN RATS DURING ACUTE IMMOBILIZATION
L. N. Katyukhin and M. N. Maslova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 58-64 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 43-47 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The standard clinical parameters of red blood, morphometric characteristics, membrane resistance and electrolyte balance of red blood cells of white rats exposed to acute immobilization were investigated. It was found that the immobilization of rats in small-size cages produced statistically significant changes in the concentration of ascorbic acid in the adrenals and oxycorticosteroids in plasma, as well as erythrocytosis, reduction of red blood cell size, planocytosis and decrease of intracellular sodium. The above parameters did not return to the norm 24 hours after 3-hour immobilization. It is suggested to use the amount of plasma per red blood cells as a stress-marker in red blood. Author

N84-30652# Joint Publications Research Service, Arlington, Va.
ULTRASOUND DISTRIBUTION AND BONE CALCIUM CONTENT IN EXPERIMENTAL ANIMALS SUBMITTED TO HYPOKINESIA AND WEIGHTLESSNESS
Yu. Zh. Saulgozis, V. Ye. Novikov, M. A. Dobelis, Ye. A. Ilin, and V. I. Lebedev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 65-71 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 48-52 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The velocity of ultrasonic propagation, calcium content and femur size of rats exposed to actual and simulated weightlessness were investigated. The exposure slowed down the ultrasonic velocity in bones. The effect of the calcium content on the ultrasonic velocity in various bone sites was different: as a rule there was a positive correlation in diaphyses and negative correlation in epiphyses. These specific features should be taken into consideration when new methods of bone ultrasonic diagnostics are developed. Author

N84-30653# Joint Publications Research Service, Arlington, Va.
ULTRASONOGRAPHY OF CANINE SOFT TISSUES DURING DECOMPRESSION
V. P. Nikolayev, V. P. Katuntsev, R. T. Kazakova, K. S. Yurova, T. D. Doronina, A. D. Mansfeld, P. K. Chichagov, and A. M. Reyman *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 72-78 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 52-57 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Ultrasonic location of femoral soft tissues of anesthetized dogs was performed using a modified unit UZKAP-3. The animals were exposed to 0.5 mPa for 2 hours and then to decompression to sea level pressure. The concomitant echographic changes pointed to the formation of extra- and intra-vascular gas bubbles in the above tissues. The bubbles could be identified visually in the nearest echographic band because the instrumentation used made it possible to eliminate the background image of structural inhomogeneities of the tissue layer. Author

N84-30654# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL STATE AND WORK CAPACITY OF MAN WHEN BREATHING OXYGEN AND HYPOXIC MIXTURES UNDER POSITIVE PRESSURE
M. D. Draguzya, V. I, Kopanev, and S. I. Lustin *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 79-83 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 57-60 (For primary document see N84-30642 20-52)
Avail: NTIS HC A07

Experiments were carried out at sea level to investigate tolerance and work capacity of test subjects breathing 100% oxygen and hypoxic gas mixtures (HGM) containing 12.7 to 12.8% O2 at a positive pressure of 800 mm H2O. All test subjects tolerated 1 hour exposure to 100% O2 or HGM under positive pressure. However, HGM induced more distinct cardiopulmonary changes than O2. During the first minutes of exposure to positive pressure breathing the tracking performance deteriorated most. The number of errors was 24.5% with O2 and 21.4% with HGM more than in the pretest study. As the adaptation developed, the number of tracking errors decreased to reach the pretest level with O2 and to remain 6 to 10% higher than the pretest level with HGM. M.G.

N84-30655# Joint Publications Research Service, Arlington, Va.
ADRENAL-HYPOTHALAMUS-PITUITARY SYSTEM REACTIONS IN RATS COOLED IN A HYPOXIC-HYPERCAPNIC GAS ATMOSPHERE
S. S. Mogutov, Ye. S. Sergeyeva, and V. P. Yevgrafyev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 84-90 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 61-65 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The rearrangement of the adrenal-hypothalamus-pituitary system of rats kept in a low temperature hypoxic-hypercapnic atmosphere was investigated. Phasic changes of the system were detected, with their magnitude and sign depending on the exposure time. The central and peripheral components of the system developed specific relations. One of the peculiarities of the responses of the adrenal-hypophysis-pituitary (sic) system to the above exposure is a limited range of changes in the neuroendocrine activities due to a total reactivity decrease. This protects the neuroendocrine system from overstrain or involvement in overshooting reactions. It is assumed that this type of response of the adrenal-hypophysis-pituitary (sic) system is important to help understand mechanisms of the neutroendocrine regulation of the adaptive process developing in response to the combined effect. Author

N84-30656# Joint Publications Research Service, Arlington, Va.
EXCHANGE OF GASES AND PHYSICAL WORK CAPACITY IN NATIVES OF DIFFERENT GEOGRAPHIC REGIONS c62
N. A. Agadzhanyan, A. I. Yelfimov, A. Ye. Severin, and I. A. Pas *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 91-95 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakos-

mich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 65-68 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

A study was carried out to investigate exercise tolerance, gas exchange and external respiration of Latin-American students who lived in Moscow for a year. As controls Soviet students residing in and around Moscow were used. The above parameters were measured at a different time of day in response to a hypercapnic exposure. Exercise tolerance was determined using the test PWC(170). External respiration and gas exchange were investigated at rest and during 5 min exercises with a load of 1 and 2 Wt/kg body weight. CO2 sensitivity was determined by means of the rebreathing method. In the evening the Latin-American students showed a trend towards an increase of the cardiorespiratory activity and exercise tolerance. The Soviet students did not display changes in exercise tolerance. The Latin-American students showed an increase in the morning and a decrease in the evening of external respiratory reactions. The Soviet students exhibited opposite variations. Direct alveolar measurements demonstrated an increase of pCO2 in the alveolar air in the Latin-American students in the evening and a decrease of the parameter in the Soviet students. It is suggested that cyclic changes in external respiration in response to hypercapnia are associated with exercise tolerance. Author

N84-30657# Joint Publications Research Service, Arlington, Va.
RAT BEHAVIOR IN SELECTION OF NEGATIVE STIMULUS: PAIN OR EXPOSURE TO ELECTROMAGNETIC FIELD
B. I. Davydov, I. B. Ushakov, V. S. Tikhonchuk, and A. A. Galkin *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 96-99 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 68-71 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

An experimental model of two conflicting motives was developed and tested on rats. The motives are to escape a painful stimulation and subsequent microwave irradiation at a dose rate of 500 mWt/sq cm under normal conditions and disturbed thermal regulation due to gamma irradiation of the head. It is found that microwave effects cannot be entirely attributed to the body temperature gradient. Author

N84-30658# Joint Publications Research Service, Arlington, Va.
EFFECT OF HIGH AMMONIA CONTENT IN PRESSURE CHAMBER ATMOSPHERE ON HUMAN ADRENOCORTICAL SYSTEM FUNCTION c52
S. Kalandarov, V. P. Bychkov, I. D. Frenkel, and T. I. Kuznetsova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 107-110 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 75-77 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The effect of various ammonia concentrations in an enclosed atmosphere on man's adrenocortical system was investigated in five experiments on 20 young healthy test subjects. The most pronounced changes in the adrenocortical system developed when the ammonia content was 5 mg 1 cu m. Author

N84-30659# Joint Publications Research Service, Arlington, Va.
EFFECT OF LIVING CONDITIONS IN CONFINED SPACE ON FORMATION OF BACTERIAL AEROSOL c52
G. O. Pozharskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 111-125 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 77-80 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The effect of environmental conditions (the presence of a different number of people, various parameters of the atmosphere, operation of life support systems) on the formation of bacterial aerosol was investigated. If the number of people in the enclosure increases, the bacterial aerosol formation depends primarily on the system of atmosphere conditioning. If the system functions, the occurrence of microorganisms on the internal surface grows. These findings may be used to design life support systems and to develop special measures that provide hygienic and antiepidemic conditions in a manned enclosure. Author

N84-30660# Joint Publications Research Service, Arlington, Va.
NOMOGRAM FOR DEMONSTRATING CHANGE IN CENTRAL VENOUS AND PULMONARY ARTERY PRESSURE DURING DECOMPRESSION OF DIFFERENT PARTS OF THE BODY c52
V. Ye. Katkov and V. V. Rumyantsev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 126-127 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 89-90 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Different series of comprehensive studies were made of the effects of negative pressure (NP) on the different parts of the human body: local NP to the legs, NP to the abdominal region and NP to the bottom half of the human body. In essence, the effect of this factor on central circulation was investigated, in particular, on such of its important parameters as central venous pressure (CVP) and pressure in the pulmonary artery (PPA). For convenience in evaluating the effect of NP, a nomogram is proposed. B.G.

N84-30661# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF BLOOD COAGULATING AND FIBRINOLYTIC SYSTEMS ON FUNCTIONAL STATE OF LYSOSOMAL SYSTEM OF NEUTROPHIL LEUKOCYTES DURING EXPOSURE OF THE BODY TO LOW BAROMETRIC PRESSURE c52
N. V. Lunina and A. F. Poltavskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 128-131 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 90-92 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Typical changes are observed in the blood system when man and animals are exposed to low barometric pressure, which are important to the body's adaptation to changing environmental conditions. There is stimulation of myelopoiesis noted in the peripheral blood. Animal experiments show that when the body is exposed to noninfectious stressors, in particular, acute loss of blood, not only is the development of absolute neutrophil leukocytosis, but there is a decrease in the number of neutrophilleukocyte lysosomes. The possible correlation between decrease in number of lysosomes in neutrophils and change in activity of blood clotting and fibrinolytic systems when animals are exposed to low barometic pressure was investigated. The lysosomal marker enzyme, cathepsin D, which is a measure of the functional activity of lysosomes and parameters of blood clotting and fibrinolytic systems was assayed in blood plasma. B.G.

N84-30662# Joint Publications Research Service, Arlington, Va.
SIMULATION OF PHYSIOLOGICAL EFFECTS OF NEGATIVE PRESSURE ON MAN c52
V. V. Rumyantsev and V. Ye. Katkov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 132-134 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 92-93 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

Pressure in the pulmonary artery and central venous pressure are informative indicators for evaluation of the effects of lower body negative pressure and local negative pressure to both legs and the abdominal region. With the use of these indicators, a mathematical model was developed that describes the changes in central circulation during decompression of different parts of the human body. B.G.

N84-30663# Joint Publications Research Service, Arlington, Va.
INDIVIDUAL DISTINCTIONS OF HUMAN SLEEPING RESPIRATION AT ALTITUDE OF 4200 METERS c52
Ye. P. Gora *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 135-138 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 93-95 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

The study of respiration during sleep under hypoxic conditions makes it possible to investigate more thoroughly the mechanisms of adaptation. Studies of physiology of sleep under normal conditions establish a relationship between different sleep phases and specific nature of breathing. In a drowsy state, respiration is often periodic; during slow deep sleep it is rhythmic and there is attenuation of pulmonary ventilation. The stage of rapid eye movement (REM) corresponds to some increase in ventilation with non-rhytmic breathing. At the present time, a clearcut idea about the relationship between different phases of sleep and the specific nature of respiration at high altitudes is not available. The individual distinctions of change in respiration during nocturnal sleep at the first stage of adaptation to hypoxia were studied. Author

N84-30664*# National Aeronautics and Space Administration, Washington, D. C.
NASA SPACE BIOLOGY ACCOMPLISHMENTS, 1983-84
Thora W. Halstead, F. Ronald Dutcher (George Washington Univ.), and Linda G. Pleasant (George Washington Univ.) Aug. 1984 123 p
(Contract NASw-3165)
(NASA-TM-86654; NAS 1.15:86654) Avail: NTIS HC A06/MF A01 CSCL 06B

Approximately 42 project summaries from NASA's Space Biology Program are presented. Emphasis is placed on gravitational effects on plant and animal life. The identification of gravity perception; the effects of weightlessness on genetic integrity, cellular differentiation, reproduction, development, growth, maturation, and senescence; and how gravity affects and controls physiology, morphology, and behavior of organisms are studied. E.R.

N84-30665*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GLOBAL BIOLOGY RESEARCH PROGRAM: BIOGEOCHEMICAL PROCESSES IN WETLANDS
David S. Bartlett, ed. Washington Aug. 1984 43 p refs Workshop held in Arlington, 22-24 Mar. 1983
(NASA-CP-2316; L-15791; NAS 1.55:2316) Avail: NTIS HC A03/MF A01 CSCL 13B

The results of a workshop examining potential NASA contributions to research on wetland processes as they relate to global biogeochemical cycles are summarized. A wetlands data base utilizing remotely sensed inventories, studies of wetland/atmosphere exchange processes, and the extrapolation of local measurements to global biogeochemical cycling processes were identified as possible areas for NASA support. For individual titles, see N84-30666 through N84-30668.

N84-30666*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXECUTIVE SUMMARY: BACKGROUND
In its Global Biol. Res. Program. Biogeochem. Process. in Wetlands Aug. 1983 p 1-6 (For primary document see N84-30665 20-51)
Avail: NTIS HC A03/MF A01 CSCL 13B

Background information on, and the objectives of, the NASA Global Biology Research Program are given. The following issues were addressed: (1) geographic distribution of wetland parameters, (2) the processes of wetland material fluxes, and (3) the relation of local fluxes with global processes. Wetland inventorying and categorizing, gas-phase exchanges with the atmosphere, material exchange with the aquatic environment, and material storage in wetland sediments were identified as topics requiring further research. R.S.F.

N84-30667*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GEOGRAPHIC DISTRIBUTION OF WETLAND PARAMETERS: THE FOUNDATION OF A DATA BASE
In its Global Biol. Res. Program. Biogeochem. Process. in Wetlands Aug. 1984 p 6-14 (For primary document see N84-30665 20-51)
Avail: NTIS HC A03/MF A01 CSCL 13B

Few quantitative estimates exist concerning the large fluxes of various materials between wetlands and adjacent bodies of water and the atmosphere. Three areas research were identified which will aid in the quantitative assessment of wetland biogeochemical processes: (1) geographic distribution of wetland parameters, (2) the processes involved in wetland material fluxes, and (3) the extrapolation of local measurements of material fluxes and storage to large geographic areas. R.S.F.

N84-30668*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A FRAMEWORK FOR WETLANDS RESEARCH: DEVELOPMENT OF A WETLANDS DATA BASE
In its Global Biol. Res. Program. Biogeochem. Process. in Wetlands Aug. 1983 p 14-32 (For primary document see N84-30665 20-51)
Avail: NTIS HC A03/MF A01 CSCL 13B

Issues related to the assembly of a comprehensive global wetlands data base are presented. A strategy to collect relevant data for wetland ecosystems through remote sensing inventories of wetland distribution was discussed. Elements of a research program on biogenic gas fluxes were identified. The major wetland parameters and their functional importance to material exchange mechanisms are summarized. R.S.F.

N84-30669# School of Aerospace Medicine, Brooks AFB, Tex.
DELAYED EFFECTS OF PROTON IRRADIATION IN MACACA MULATTA. 3: GLUCOSE INTOLERANCE Interim Report, 1964 - 1983
Y. L. Salmon, M. G. Yochmowitz, and D. H. Wood Mar. 1984 28 p
(AF Proj. 1921; AF Proj. 7757)
(AD-A142289; USAFSAM-TR-84-7) Avail: NTIS HC A03/MF A01 CSCL 06/18

A group of rhesus monkeys is being studied in a lifetime survey of the delayed effects of proton irradiation. The animals were exposed during the period 1964 - 1969 to single total-body doses of protons covering the spectrum of energies and total doses that might be expected to occur in space during a major solar flare event. This report describes the results of intravenous glucose tolerance test and the insulin response to glucose challenge in 106 irradiated animals, their control group of 42, and 10 younger control animals. The results indicate that the clearance rate of blood glucose is influenced by the age of the animal and by the type and energy of the radiation. Animals receiving greater than 360 rads of proton irradiation of energies above 138 MeV had significantly slower glucose clearance than nonirradiated controls. Seventeen-twenty-year-old controls were less glucose tolerant than 9-11-year-old controls. Animals with normal glucose tolerance showed considerable individual variation in insulin response, while in animals with marked glucose intolerance (clearance rate $<$ 1.0 %/min), low insulin response was a consistent finding. GRA

N84-30670# Utah Univ., Salt Lake City.
BIOLOGICAL EFFECTS OF MILLIMETER-WAVE IRRADIATION: LIVING BACTERIAL ORGANISMS Final Report, 15 Jul. 1982 - 14 Oct. 1983
O. P. Gandhi, D. W. Hill, L. Furia, M. F. Iskander, and D. Ghodgaonkar Brooks AFB, Tex. School of Aerospace Medicine Apr. 1984 37 p
(Contract F33615-82-K-0631)
(AD-A142474; UTEC-83-84004; USAFSAM-TR-84-11) Avail: NTIS HC A03/MF A01 CSCL 06/18

The report describes experiments on the effects of millimeter-wave irradiation on the mutation rates of Salmonella typhimurium straisn TA 1535 and TA 1538. No frequency-sensitive irradiation effects have been observed in spite of closely spaced frequencies used in the 42-48 and 65-75 GHz bands. Some preliminary experiments performed with yeast Saccharomyces cerevisiae have given rates of growth that are dependent on the irradiation frequency. However, on account of the high degree of variability, accurate frequency resettability is a must before firm conclusions can be drawn. A new method for measuring complex permittivities of biological media in vitro and in vivo has been proposed and tested for feasibility. Raman laser spectroscopy is proposed as a means of searching for frequency-specific biological effects of millimeter-wave irradiation. The Raman system setup for these studies is used for pilot studies with vesicular stomatitis, Sindbis, and LaCrosse viruses and with bacillus megaterium. GRA

N84-30671# Baylor Coll. of Medicine, Houston, Tex. Dept. of Physiology.
INTERNATIONAL WORKSHOP ON BIOPHYSICAL CORRELATES OF CELLULAR FUNCTION UNESCO Final Report, 1 Apr. 1983 - 31 Mar. 1984
C. F. Hazlewood 3 May 1984 10 p
(Contract N00014-83-G-0056)
(AD-A142490) Avail: NTIS HC A02/MF A01 CSCL 06/16

The scientific sessions began with three lectures which provided a broad overview of our current understanding of cellular structure and function. These lectures set the stage for the remainder of the workshop which involved the presentation of data related to the interrelationships between cellular function and structure, the latest concepts of cellular transport processes, the physical state of water and ions in cells, and divergent view of cellular function. In addition to these, the last session dealt with the applications of new technologies to the broad range of biophysical problems which were discussed throughout the workshop. The role of membranes and the cytoplasm in the control of the cellular environment were of major focus during the Tuesday and Wednesday sessions. The latest information on membrane transport proteins were presented by leading authorities in this field. New information on the role of the cytoplasmic matrix in the control of the cellular environment was presented and extensively discussed. There emerged what appears to be a consensus that a significant amount of ion binding is present in cell membranes as well as the cytoplasmic matrix. In addition, new information was presented on the diffusive motion and the relaxation processes of water molecules in various cellular systems. GRA

N84-30672# California Univ., Davis. Lab. for Energy Related Health Research.
LABORATORY FOR ENERGY RELATED HEALTH RESEARCH Annual Report, 1982
Aug. 1983 180 p refs
(Contract DE-AC03-76SF-00472)
(DE84-000529; UCD-472-128; AR-17) Avail: NTIS HC A09/MF A01

This is the 17th Annual Report of the Laboratory for Energy Related Health Research. The current Laboratory program can be segregated into radiation studies and studies on fossil energy. This year's report includes status reports on the metabolism, dosimetry, and pathology of bone seeking radiostrontium and radium in dogs. An interesting development is the apparent increase in bone tumor latency with decreasing skeletal dose and the influence of radiation quality on this endpoint. While (226)Ra caused dose related effects in the eye, (90)Sr does not. Continual exposure to external irradiation almost always induces myeloid leukemia if the exposure begins in utero. These dogs are also resistant to lethal aplasia which is normally seen at intermediate dose rates in post natally irradiated animals. Studies on radiation effects on cells include marrow cells from irradiated animals as well as determination of responses of hematopoietic cells and their progenitors to radiation and other tests in vitro. Study of lymphocytes from preleukemic patients show interesting functional differences compared to normal values. New techniques were developed to reevaluate histocompatibility and response to stimulation. New information is being derived about acute and chronic irradiation effects on spermatogenesis. DOE

N84-30673# Minnesota Univ., Minneapolis.
VERTEBRATE BEHAVIOR AND ECOLOGY Final Report, 16 Oct. 1967 - 31 May 1983
John R. Tester and Donald B. Siniff Feb. 1984 29 p refs
(Contract DE-AC02-76EV-01332)
(DE84-007318; DOE/EV-01332/1) Avail: NTIS HC A03/MF A01

Radio telemetry engineering, design and development has focused on high power transmitters, ultrasonic receivers and transmitters, corrosive links, high frequency transmitters and implanted transmitters. Ranges from implanted transmitters are approximately 4 to 10 times less than from external transmitters due to fundamental limitations of small antennas. Social organization, movements, activities, foraging strategies, and population dynamics of sea otters (Enhydra lutris) were investigated from 1979 to 1982 in Prince William Sound, Alaska. It was found that otters in newly occupied male areas spent 23% less time feeding but obtained 38% more calories per day than otters in the area of prolonged occupation where food was less abundant. Reduction of boat traffic during winter in most recently occupied male areas prompted large seasonal influxes of otters. Females were capable of reproducing annually, but rarely did so under food stressed conditions. The population segment in the male areas increased at a rate of 50% per year as male pups dispersed from all parts of the Sound into this region, and few animals died. DOE

N84-30674# Connecticut Univ., Storrs. Inst. of Water Resources.
SALINITY AND TEMPERATURE EFFECTS ON PHOTOSYNTHESIS AND ORGANIC CARBON RELEASE RATES BY SELECTED BENTHIC MACROALGAE
Charles Yarish and Mark Heller Sep. 1983 53 p refs
(Contract DI-14-34-0001-2107)
(PB84-163146; OWRT-A-091-CONN(1)) Avail: NTIS HC A04/MF A01 CSCL 08A

Estuarine benthic macroalgae are excellent producers of new carbonaceous material through their high rates of photosynthesis. Under some circumstances, this organic carbon is liberated into the aquatic environment in dissolved form while the plant is actively photosynthesizing. This project established a protocol for examining the effects of different combinations of salinity, temperature, and emergence/submergence regimes, determined the effects of antibiotics on the photosynthetic rate, and the extent to which these factors effect liberation of organics by selected estuarine benthic macroalgae. GRA

N84-30675# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES
30 Jul. 1984 120 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UBB-84-016) Avail: NTIS HC A06

Topics in biological, biomedical, and behavioral science were addressed. The following subject areas were considered: agriculture, biochemistry, biophysics, biotechnology, ecology, epidemiology, food technology, genetics, human factors engineering, immunology, laser effects, microbiology, military medicine, nonionizing electromagnetic radiation effects, pharmacology, toxicology, physiology, public health, psychology, veterinary medicine, and virology. For individual titles, see N84-30676 through N84-30682.

N84-30676# Joint Publications Research Service, Arlington, Va.
ENGINEERING PHYSIOLOGY: NEW AREA FOR USE OF CONTROL THEORY Abstract Only c54
V. N. Novoseltsev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 51 Transl. into ENGLISH from Izmereniya Kontrol Avtomatiz. (Moscow), no. 4, 1983 p 55-63 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

The task of engineering physiology is to study and organize the interaction of technical control systems with the physiological systems of the body to maintain its viability and working capacity. In developing the methodological bases of engineering physiology systems, the requirements of the body and nature of homeostasis are formalized and described. The resulting expressions are then used to construct models of engineering physiology systems. For example, individual protective devices including passive isolation, active isolation, and artificial flows of matter and energy modify the demand equations of the model. A similar situation exists in medical engineering physiology, particularly with regard to auxiliary organs. The development of control algorithms, such as the one needed for an artificial pancreases, is also based on models. Engineering physiology successfully copes with the transport functions of the body, but is not yet adequate for biochemical and metabolic processes. The control of medical devices for delivery of nutrients and oxygen and the removal of waste is well developed, while control of heat producing, energetic, and synthetic processes requires further research. Author

N84-30677# Joint Publications Research Service, Arlington, Va.
BILATERAL CAROTID LIGATION AND EFFECTS OF ELECTROMAGNETIC FIELD ON CONDITIONED REFLEX RETENTION AND CEREBRAL NUCLEIC ACID LEVELS Abstract Only
S. V. Rutsay and I. S. Surkova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 65 Transl. into ENGLISH from Byul. Eksperim. Biol. i Med. (Moscow), no. 5, May 1983 p 62-64 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

The retention of an avoidance conditioned reflex and the cerebral cortical levels of DNA and RNA in outbred rats subjected to bilateral carotid ligation and subsequent exposure to a decimeter-wave electromagnetic field (EMF) were investigated. Ligation of the carotids led to deterioration of the conditioned response, with further decrease in performance seen in animals subjected to the EMF within two hours of operation. Re-exposure to the EMF after two days actually improved performance on the avoidance test in some rats, but in the majority (63.6 %) significant clinical deterioration which terminated in convulsions and death was observed. Exposure of unoperated control animals to the EMF was without effect. Biochemical studies showed that the EMF potentiated DNA and RNA synthesis in the brain stem to above-control levels. In the cerebral cortex, EMF-induced RNA synthesis exceeded slightly the control level, while DNA synthesis increased to an intermediate level between unoperated controls and ligated, but unirradiated, animals. These findings point to the considerable individual variability in the responses of animals to EMF, and suggest that caution be exercised in the use of EMF for the treatment of carotid insufficiency in humans. Author

N84-30678# Joint Publications Research Service, Arlington, Va.
TIME-DEPENDENT SPINAL CORD CHANGES FOLLOWING NONIONIZING MICROWAVE IRRADIATION Abstract Only
V. S. Belokrinitskiy *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 66 Transl. into ENGLISH from Byul. Eksperim. Biol. i Med. (Moscow), no. 5, May 1983 p 98-100 (For primary document see N84-30675 20-51)
Avail: NTIS HC A06

The spinal cords of dogs and cats subjected to nonionizing microwave irradiation were investigated using histopathological methods. Sequential studies covering days 2 to 30 showed that the changes in both species were analogous despite differences in duration of exposure (one hr in cats and four hr in dogs), with initial changes evident within a day of the insult. The salient features were dystrophic changes and destruction of the neurons and glial activation. The neuroglial activation. The changes were progressive, and by day 10 more than 50% of the neurons were destroyed, while the initial hyperplasia of the glial elements was replaces by degenerative changes. Synaptic structures were also affected and underwent progressive dissolution; the synapses on the larger motor neurons were more refractory to destruction. The histopathology findings observed in the experimental animals can be correlated with clinical findings in humans exposed to microwave irradiation. Author

N84-30679# Joint Publications Research Service, Arlington, Va.
EFFECT OF CONSTANT AND LOW-FREQUENCY MAGNETIC FIELDS ON BIOLOGICAL SYSTEMS Abstract Only c52
L. A. Piruzyan and A. N. Kuznetsov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 66 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Ser. Biol. (Moscow), no. 6, Nov. - Dec. 1983 p 805-821 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

The biological effects of constant and low frequency magnetic fields were investigated. The course of this investigation along with some results and future prospects were discussed. Various levels of organization of biological and model systems were examined. Electromagnetics with a high degree of stability and field homogeneity were used in most of the experiments. The studies performed indicate that magnetic fields do have an effect on some biological systems under some conditions. The large numbers of negative results demonstrate that there is as yet no accurate understanding of the mechanisms of action of such fields. The liquid crystal hypothesis and the spin block hypothesis remain the strongest contenders for explanation of the biological effects, although they do not exclude other possible mechanisms. The weak nature of the effects in comparison to chemical and other effects forces great caution in the performance of experiments. Author

N84-30680# Joint Publications Research Service, Arlington, Va.
DISSOCIATION OF AMINO ACID-DNA COMPLEXES UNDER INFLUENCE OF LONG-WAVE UV LIGHT Abstract Only c25
Ye. M. Mil and V. M. Zhiltsova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 67 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Ser. Biol. (Moscow), no. 6, Nov. - Dec. 1983 p 925-928 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

The influence of ultraviolet (UV) light with a wave-length at least 310 nm on model DNA-tyrosine, DNA-tryptophan, and DNA-histidine complexes was investigated to determine changes in the structure of DNA when these model complexes are irradiated. Sheep thymus and rat spleen DNA preparations were utilized. The amino acid concentration was determined by reaction with ninhydrin after preliminary dialysis. The DNA solutions and model complexes were irradiated in an NaCl-citrate buffer. Structural changes caused by the UV light were studied by means of a spin-labeled dye method. It was found that an external, electrostatic complex type dissociates under the experimental conditions. An internal complex type is resistant to the radiation and apparently responsible for the specific effect of the exposure-sensitization in the case of formation of DNA complex with tyrosine or tryptophan and protection from UV light upon formation of a complex with histidine. Author

N84-30681# Joint Publications Research Service, Arlington, Va.
REACTIONS OF CEREBRAL CORTEX NEURONS TO ALTERNATING MAGNETIC FIELD ON GLUTAMIC ACID Abstract Only
L. P. Soldatova and N. A. Udintsev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBP-84-016) 30 Jul. 1984 p 67-68 Transl. into ENGLISH from Biol. Nauki (Moscow), no. 1, Jan. 1984 p 52-54 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

The possibility of preventing or reducing morphologic damage to cerebral cortex neurons caused by exposure to magnetic fields through the administration of glutamic acid was examined. Preliminary administration of sodium glutamate to white rats was found to significantly reduce damage to cortical neurons caused by exposure to an alternating magnetic field of 20 mT in tests with five-times exposure for 6.5 hours. The male white rats received sodium glutamate subcutaneously at 1 mg per g of body mass. Pathological and morphological changes in neurons are illustrated by photomicrographs. The protective effect of the sodium glutamate is associated with its properties as a general adaptogen, as well as its ability to regulate the metabolism and status of the neuroendrocrine system. Glutamic acid and its related metabolites apparently regulate energy metabolism and ion-electrolyte balance, decreasing edema and vacuolization of cortical neurons. Author

N84-30682# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF MICROWAVE ELECTROMAGNETIC RADIATION AND CERTAIN HORMONES ON OSMOTIC RESISTANCE OF MOUSE ERYTHROCYTES Abstract Only
V. M. Koldayev and N. A. Lazerenko *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 68 Transl. into ENGLISH from Byul. Eksperim. Biol. i Med. (Moscow), no. 1, Jan. 1984 p 51-52 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

The influence of hydrocortisone, adrenalin, and corticotropin on the erythrocyte osmotic resistance of mice exposed to microwave radiation was investigated. The microwave irradiation was administered daily for 8 min for 12 days, intensity 62 + or - 5 mW/sq cm, frequency 2374 MHz. Experiments were performed on 594 white mice of both sexes. Groups of mice received adrenalin,, hydro-cortisone, or corticotropin every other day for 12 days. Erythrocyte osmotic resistance was determined on days 2, 4, 6, 8, 10, 12, and 17 of the experiments, 30 minutes after microwave irradiation or adminstration of the substances. No significant difference in osmotic resistance was observed between healthy and control mice, and the use of the hormones alone had no significant influence on osmotic resistance of erythrocytes in nonirradiated mice. Mice receiving radiation and isotonic NaCl solution showed an increase in T sub 50 during the first 6 days by a factor of 1.25 to 1.30. Mice receiving hydrocortisone and corticotropin showed less change in osmotic resistance, T sub 50 increasing by only 15% to 17% by day 8 of the experiment. Adrenalin had a similar influence, though weaker than that of hydrocortisone. Author

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N84-30683* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 261)
Aug. 1984 82 p
(NASA-SP-7011(261); NAS 1.21:7011(261)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 281 reports, articles and other documents introduced into the NASA scientific and technical information system in July 1984. Author

N84-30684*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
INCREASE IN WHOLE-BODY PERIPHERAL VASCULAR RESISTANCE DURING THREE HOURS OF AIR OR OXYGEN PREBREATHING
James M. Waligora, David J. Horrigan, Johnny Conkin (Technology Inc.), John J. Dierlam (Technology Inc.), John Stanford, Jr. (Technology Inc.), and Jeanne R. Riddle (Technology Inc.) Aug. 1984 15 p refs
(Contract NAS9-17200)
(NASA-TM-58261; S-537; NAS 1.15:58261) Avail: NTIS HC A02/MF A01 CSCL 06E

Male and female subjects prebreathed air or 100% oxygen through a mask for 3.0 hours while comfortably reclined. Blood pressures, heart rate, and cardiac output were collected before and after the prebreathe. Peripheral vascular resistance (PVR) was calculated from these parameters and increased by 29% during oxygen prebreathing and 15% during air prebreathing. The oxygen contributed substantially to the increase in PVR. Diastolic blood pressure increased by 18% during the oxygen prebreathe while stystolic blood pressure showed no change under either procedure. The increase in PVR during air prebreathing was attributed to procedural stress common to air and oxygen prebreathing. Author

N84-30685# Colorado Univ., Boulder. Inst. of Behavioral Genetics.
ORGANOPHOSPHATE TOXICITY: GENETICS, RECEPTORS, AND ANTIDOTES Annual Progress Report, 15 Sep. 1982 - 14 Sep. 1983
A. C. Collins Nov. 1983 44 p
(Grant AF-AFOSR-0300-82; AF Proj. 2312)
(AD-A141059; AFOSR-84-0400TR) Avail: NTIS HC A03/MF A01 CSCL 06/20

Studies were completed on the time course of the effect of DFP on brain acetylcholinesterase ACH activity. While brain ACH activity is maximally depressed only 5 minutes after administration, most behavior effects require two or more hours before the maximal effect is seen. Following a 6.33 mg/kg dose of DFP the activity of brain ACH does not return to control levels, even after 30 days. This effect is dose-dependent and affects all brain regions equally. Behavioral studies as well as studies to demonstrate tolerance to DFP have been conducted. Pyridine Chemistry has been studied in an attempt to develop nictonic receptor agonists. GRA

N84-30686# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
PRISM: A PRACTICAL REAL-TIME IMAGING STEREO MATCHER
H. K. Nishihara May 1984 34 p
(Contract N00014-80-C-0505)
(AD-A142532; AI-M-780) Avail: NTIS HC A03/MF A01 CSCL 17/8

A binocular-stereo-matching algorithm for making rapid visual range measurements in noisy images is described. This technique is developed for application to problems in robotics where noise tolerance, reliability and speed are predominant issues. A high speed pipelined convolver for preprocessing images and an unstructured light technique for improving signal quality are introduced to help enhance performance to meet the demands of this task domain. These optimizations, however, are not sufficient. A closer examination of the problems encountered suggests that broader interpretations of both the objective of binocular stereo and of the zero-crossing theory of Marr and Poggio are required. In this paper, we restrict ourselves to the problem of making a single primitive surface measurement. For example, to determine whether or not a specified volume of space is occupied, to measure the range to a surface at an indicated image location, or to determine the elevation gradient at that position. In this framework, we make a subtle but important shift from the explicit use of zero-crossing contours (in band-pass filtered images) as the elements matched between left and right images, to the use of the signs between zero-crossings. With this change, we obtain a simpler algorithm with a reduced sensitivity to noise and a more predictable behavior. The PRISM system incorporates this algorithm with the unstructured light technique and a high speed digital convolver. It has been used successfully by others as a sensor in a path planning system and a bin picking system. GRA

N84-30687# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
COMPUTATIONAL EXPERIMENTS WITH A FEATURE BASED STEREO ALGORITHM
W. E. L. Grimson Jan. 1984 40 p
(Contracts N00014-80-C-0505; N00014-82-K-0334)
(AD-A142549; AI-M-762) Avail: NTIS HC A03/MF A01 CSCL 20/6

Computational models of the human stereo system can provide insight into general information processing constraints that apply to any stereo system, either artificial or biological. In 1977, Marr and Poggio proposed one such computational model, that was characterized as matching certain feature points in difference-of-Gaussian filtered images, and using the information obtained by matching coarser resolution representations. An implementation of the algorithm and its testing on a range of images was reported in 1980. Since then a number of psychophysical experiments have suggested possible refinements to the model and modifications to the algorithm. As well, recent computational experiments applying the algorithm to a variety of natural images, especially aerial photographs, have led to a number of modifications. In this article, we present a version of the Marr-Poggio-Grimson algorithm that embodies these modifications and illustrate its performance on a series of natural images. Author (GRA)

N84-30688# Army Environmental Hygiene Agency, Aberdeen Proving Ground, Md.
GUIDELINES FOR RUNNING THE THERMAL COMPUTATIONAL MODEL OF THE EYE
W. J. Marshall and T. J. White Jun. 1984 51 p
(AD-A142550) Avail: NTIS HC A04/MF A01 CSCL 06/18

A computational thermal model of the eye was developed during the 1970's. The program was set up in cylindrical coordinates allowing various pulse shapes in time and space. Improvements in the latest version were the addition of a damage calculation and an iterative technique for achieving a uniform damage level for comparison between computer runs. A user-friendly computer listing and data samples are included as well as instructions for making a computer run. GRA

N84-30689# Boston Univ., Mass. Center for Adaptive Systems.
NONLINEAR DYNAMICS OF MULTI-CHANNEL BINOCULAR VISION Annual Scientific Report, 1 Feb. 1983 - 31 Jan. 1984
S. Grossberg 7 Mar. 1984 20 p
(Contract F49620-83-C-0066)
(AD-A142600; AFOSR-84-0527TR) Avail: NTIS HC A02/MF A01 CSCL 06/4

Progress was made in three related areas: vision, movement, and rhythm. A realtime processing theory was introduced of how the visual system discounts several types of noise in visual data, yet rapidly generates global visual representations. These mechanisms can be interpreted both behaviorally and neurally. The mechanisms describe new parallel processing algorithms that operate within hierarchical networks. Simulations were made of real and illusory contour formation, neon color spreading, complementary color induction, and filling-in. The theory physically interprets and generalizes Land's retinex theory of color vision, and unifies the explanation of monocular and binocular brightness data. The simulated data include Craik-O'Brien effects and their exceptions; the Bergstrom demonstrations comparing brightness of smoothly modulated and step-like luminance profiles; nonclassical differences between the perception of luminance decrements and increments; Fechner's paradox, binocular brightness averaging, and binocular brightness summation; binocular rivalry; and fading of stabilized images and ganzfelds. Two parallel contour processes interact to generate the theory's brightness, color, and form explanations. GRA

N84-30690# Armed Forces radiobiology Research Inst., Bethesda, Md.
THE TOXICITY OF PETROLEUM AND SHALE JP5
V. Bogo, R. W. Young, T. A. Hill, C. L. Feser, and J. Nold Sep. 1983 25 p
(AD-A142670; AFRRI-SR83-26) Avail: NTIS HC A02/MF A01 CSCL 06/20

The toxicity of petroleum- and shale-derived jet propulsion fuel no. 5 (JP5) was evaluated in a series of acute average and subchronic inhalation studies with rats. In the gavage studies, the LD50/14 for rats was 26 ml/kg for Gary-Western shale, 39 ml/kg for Sohio shale and greater than 60 ml/kg for Exxon shale and petroleum JP5. Significant hepatic periportal fatty degeneration and renal eosinophilic hyaline droplets were observed for all fuels. Multiple hepatic cytoplasmic vacuoles were detected as early as 6 hours after both petroleum and Sohio shale JP5 exposures but were undetectable after 96 hours. Weight and consumption of food and water were reduced for 2 to 3 days after administration of petroleum or Sohio shale JP5. Activity markedly increased between 2.5 and 6 hours after dosing for both petroleum and Sohio shale JP5. The inhalation studies showed that water consumption increased after 8 days of exposure to petroleum or Sohio shale and remained elevated for the duration of the 30-day studies. However, no significant effects on tissue morphology or hepatic and renal serum chemistries were observed after exposure to petroleum or Sohio shale JP5, and peak amplitudes or latencies for the SEPs did not significantly change during the 30-day exposure to Sohio shale JP5. GRA

N84-30691# University of Western Michigan, Kalamazoo. Dept. of Biomedical Sciences.
USE OF SPERM ENZYMES TO DETECT GENOTOXIC AGENTS Final Report, Feb. 1983 - Feb. 1984
L. C. Ginsberg, G. Ficsor, W. C. Keller, and B. M. Llewellyn May 1984 23 p
(Contract F33615-83-K-0504)
(AD-A142724; AFAMRL-TR-84-020) Avail: NTIS HC A02/MF A01 CSCL 06/20

The sperm enzyme test (SET) system consists of a series of histochemical assays that can be used to assess the functionality of sperm. The objective of this research was to determine the usefulness of the SET system in evaluation of germ cell damage which might be caused by a variety of chemicals. Mice were treated with several known mutagenic or teratogenic agents, or chemicals toxic to the reproductive system two and six weeks before collecting sperm. Sperm was stripped from the vas deferens and examined for count, motility, and the sperm enzymes, acrosin, hyaluronidase, succinic dehydrogenase (SDH), and alpha glycerolphosphate dehydrogenase (aGDH) activities. Groups of mice were treated through intraperitoneal (i.p.) or inhalation (i.h.) routes. Two weeks after treatment, the chemicals ethylnitrosourea (ENU), ethyl methanesulfonate (EMS), hydroxyurea (HU), cigarette smoke condensate (CSC), dimethyl methylphosphonate (DMMP), perfluoro-n-decanoic acid (PFDA), ethylene dibromide (EDB), and benzene were found to be positive by the SET system. At six weeks, only ENU, HU and DMMP exposures caused enzyme changes significantly different from controls, while only ENU and HU caused reduced testis weight, a conventional method of germ cell damage assessment. Two weeks after i.h. treatment, benzene and EDB were found to be positive for sperm enzyme changes, while at six weeks postexposure only DMMP was detected. GRA

N84-30692# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
THIRD WORLD CONGRESS ON EMERGENCY AND DISASTER MEDICINE
Ingemar Widegren Apr. 1984 12 p refs In SWEDISH; ENGLISH summary Congr. held at Rome, 24-27 May 1983
(FOA-C-52005-H4; ISSN-0347-7665) Avail: NTIS HC A02/MF A01

Emergency medicine disaster medicine, personnel aspects, disaster services organization, health services cooperation, and civilian-military collaboration were discussed. Author (ESA)

N84-30693# Istituto Superiore di Sanita, Rome (Italy).
PRELIMINARY RESULT OF OUR NEW NATIONWIDE EVALUATION OF X-RAY TRENDS (NEXT) PROGRAM FOR ITALY
A. Calicchia, P. L. Indovina, A. Marchetti (European Nuclear Energy Agency, Rome), and M. Paganini Fioratti (European Nuclear Energy Agency, Rome) 10 Apr. 1984 13 p refs Presented at Sci. Seminar on Criteria and Meth. for Quality Assurance in Med. X-ray Diagnosis, Udine, 17-19 Apr. 1984 Submitted for publication
(ISS-L-84/3) Avail: NTIS HC A02/MF A01

The Nationwide Evaluation of X-ray Trends program was adapted to Italian conditions. Collection of all parameters influencing patient exposure is forseen. Doses to major patient organs, such as thyroid, bone marrow, uterus, gonads, are computed. Apparatuses and radiological techniques responsible for excessively high doses are easily picked out and may then be revised or corrected. Authorities can choose the most adequate program to improve patient radiation protection. Results for a representative region are reported, and the influence of the program on quality assurance is shown. Author (ESA)

N84-30694# Southampton Univ. (England). Inst. of Sound and Vibration Research.

AUDIOMETRIC CONFIGURATIONS AND REPEATABILITY IN NOISE-INDUCED HEARING LOSS
D. W. Robinson Jun. 1984 30 p refs Sponsored by UK Medical Research Council
(ISVR-TR-123) Avail: NTIS HC A03/MF A01

The pure-tone audiograms of an otologically screened group of subjects with known noise exposures in a variety of industrial occupations are analyzed. Frequencies of the audiometric notch vary from 2.5 to over 6 kHZ, the majority occurring in the region of 4 kHZ. Notch frequency and depth are highly correlated between left and right ears. Audiogram shape is examined by reference to deviations from a normalized shape which takes care of the individual ages and noise exposures. These deviations differ widely between subjects but are highly correlated between left and right ears at each frequency. No consistent pattern is found that relates to age or to the type of noise. The shape characteristics statistics can assist in establishing limits within which an augiogram may be expected to lie in cases of hearing loss due to noise that are not confounded with other causes. Author (ESA)

N84-30695# Franklin Research Center, Philadelphia, Pa.
CHRONIC EFFECTS OF REPEATED MECHANICAL TRAUMA TO THE SKIN: A DESCRIPTION OF THE PROBLEM IN THE WORKPLACE
P. Silver, R. Mason, and G. Hagen 1983 115 p refs
(Contract PHS-NIOSH-210-81-6001)
(PB84-181767) Avail: NTIS HC A06/MF A01 CSCL 06E

The world medical literature was reviewed and analyzed to determine the long range medical and economic impacts of repeated mechanical trauma to the skin occurring within the workplace. Specific objectives were to determine the populations at risk by identifying the job tasks and other workplace factors associated with repeated mechanical skin trauma; the kinds of injuries that occur, the anatomic sites involved; an estimate of the number of workers affected in various industries and the workplace in general; and an estimate of direct costs based on lost workdays and reimbursements through workman's compensation and other insurance systems. Findings in these areas have led to recommendations for future research. Author (GRA)

N84-30643# Joint Publications Research Service, Arlington, Va.
USE OF VITAMINS DURING ADAPTATION TO HIGH ALTITUDES
M. S. Belakovskiy, N. G. Bogdanov, Ye. B. Gippenreyter, and A. S. Ushakov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 1-8 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 4-9 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30644# Joint Publications Research Service, Arlington, Va.
RELIABILITY AND EFFICIENCY OF KUBICEK RHEOGRAPHIC METHOD FOR MONITORING CARDIAC OUTPUT AND STROKE VOLUME
A. M. Genin, L. S. Zingerman, D. G. Maksimov, G. Ye. Belozerov, V. P. Katuntsev, M. V. Obukhova, K. S. Yurova, G. I. Kheymets, V. A. Galichiy, and R. I. Finaogenova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 9-15 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 9-14 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30645# Joint Publications Research Service, Arlington, Va.
WALKING ERECT AS A FACTOR IN DEVELOPMENT OF ARTERIAL HYPERTENSION IN PRIMATES
G. S. Belkaniya and V. A. Dartsmeliya *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 16-23 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 14-19 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30646# Joint Publications Research Service, Arlington, Va.
EFFECT OF DIHYDROERGOTAMINE ON HUMAN CIRCULATION DURING ORTHOSTATIC TESTS
A. Yu. Modin, S. V. Abrosimov, O. D. Anashkin, V. V. Zhidkov, V. I. Lobachik, L. B. Parashin, and V. S. Shashkov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 24-28 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 19-23 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30647# Joint Publications Research Service, Arlington, Va.
CIRCULATORY CHANGES IN ORTHOSTATIC POSITION IN THE PRESENCE OF HYPERTHERMIA
V. I. Sobolevskiy and V. P. Pravosukov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 29-32 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 23-25 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30648# Joint Publications Research Service, Arlington, Va.
BLOOD PLASMA FREE AMINO ACIDS UNDER HYPOKINETIC CONDITIONS
I. G. Popov and A. A. Latskevich *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 33-43 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 25-34 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30649# Joint Publications Research Service, Arlington, Va.
HUMAN STOMACH MOTOR AND EVACUATORY FUNCTIONS DURING ANTIORTHOSTATIC HYPOKINESIA
K. V. Smirnov, A. N. Petrusenko, and A. P. Menshchikov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 44-49 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 34-38 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30650# Joint Publications Research Service, Arlington, Va.
CIRCADIAN PATTERN OF SIMIAN FUNCTIONAL PARAMETERS DURING HYPOKINESIA AND IN THE RECOVERY PERIOD
N. F. Kolpakova and T. G. Urmancheyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 50-57 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 38-43 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30654# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL STATE AND WORK CAPACITY OF MAN WHEN BREATHING OXYGEN AND HYPOXIC MIXTURES UNDER POSITIVE PRESSURE
M. D. Draguzya, V. I. Kopanev, and S. I. Lustin *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 79-83 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 57-60 (For primary document see N84-30642 20-52)
Avail: NTIS HC A07

N84-30658# Joint Publications Research Service, Arlington, Va.
EFFECT OF HIGH AMMONIA CONTENT IN PRESSURE CHAMBER ATMOSPHERE ON HUMAN ADRENOCORTICAL SYSTEM

FUNCTION
S. Kalandarov, V. P. Bychkov, I. D. Frenkel, and T. I. Kuznetsova *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 107-110 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 75-77 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30659# Joint Publications Research Service, Arlington, Va.
EFFECT OF LIVING CONDITIONS IN CONFINED SPACE ON FORMATION OF BACTERIAL AEROSOL
G. O. Pozharskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 111-125 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 77-80 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30660# Joint Publications Research Service, Arlington, Va.
NOMOGRAM FOR DEMONSTRATING CHANGE IN CENTRAL VENOUS AND PULMONARY ARTERY PRESSURE DURING DECOMPRESSION OF DIFFERENT PARTS OF THE BODY
V. Ye. Katkov and V. V. Rumyantsev *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 126-127 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 89-90 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30661# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF BLOOD COAGULATING AND FIBRINOLYTIC SYSTEMS ON FUNCTIONAL STATE OF LYSOSOMAL SYSTEM OF NEUTROPHIL LEUKOCYTES DURING EXPOSURE OF THE BODY TO LOW BAROMETRIC PRESSURE
N. V. Lunina and A. F. Poltavskiy *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 128-131 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 90-92 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30662# Joint Publications Research Service, Arlington, Va.
SIMULATION OF PHYSIOLOGICAL EFFECTS OF NEGATIVE PRESSURE ON MAN
V. V. Rumyantsev and V. Ye. Katkov *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 132-134 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 92-93 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30663# Joint Publications Research Service, Arlington, Va.
INDIVIDUAL DISTINCTIONS OF HUMAN SLEEPING RESPIRATION AT ALTITUDE OF 4200 METERS
Ye. P. Gora *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 135-138 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 93-95 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30679# Joint Publications Research Service, Arlington, Va.
EFFECT OF CONSTANT AND LOW-FREQUENCY MAGNETIC FIELDS ON BIOLOGICAL SYSTEMS Abstract Only
L. A. Piruzyan and A. N. Kuznetsov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 66 Transl. into ENGLISH from Izv. Akad. Nauk SSSR: Ser. Biol. (Moscow), no. 6, Nov. - Dec. 1983 p 805-821 (For primary document see N84-30675 20-51)
Copyright. Avail: NTIS HC A06

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N84-30696# Advanced Research Resources Organization, Silver Spring, Md.
ANALYSIS OF COMPUTER INTERACTIVE TESTS FOR ASSIGNING HELICOPTER PILOTS TO DIFFERENT MISSIONS Research Note, 2 Nov. 1981 - 2 May 1983
D. C. Myers, F. M. Schemmer, and E. A. Fleishman Jun. 1984 58 p
(DA Proj. 2Q2-63731-A-792)
(AD-A142434; ARI-RN-84-87) Avail: NTIS HC A04/MF A01 CSCL 05/9

A test battery was developed to represent a broad range of abilities and skills that were identified as important in piloting helicopters. The battery was developed on the basis of a taxonomic approach to job analysis which linked pilot tasks to ability requirements for different mission tracks. The tests developed were based on an earlier review, by ARRO staff, of the kinds of tests likely to measure the abilities identified in the job analysis approach employed. The present study included the development, programming and pre-testing of computer interactive tests designed to measure abilities identified as underlying critical tasks in the various helicopter missions. Optimum conditions of administration were developed and test reliability was determined. Tasks judged by expert pilots to be critical for pilot effectiveness were identified as possible measures of performance in the different mission tracks. These tasks can be translated into criterion measures and used in validating the test battery developed. The purpose of the validation will be to empirically link test scores with performance in these critical tasks representing the different mission tracks. The findings would indicate if all the tests are needed or if empirical validities showed which limited set of tests can be used to predict mission performance. Author (GRA)

N84-30697# Navy Personnel Research and Development Center, San Diego, Calif.
BIOMAGNETISM: POSSIBLE NEW PREDICTOR OF PERSONNEL PERFORMANCE Interim Report, FY 1982 - 1983
G. W. Lewis and M. R. Blackburn Jun. 1984 36 p
(B99-QAXR)
(AD-A142451; NPRDC-TR-84-43) Avail: NTIS HC A03/MF A01 CSCL 05/9

The objective of this effort was to determine whether biomagnetic recordings may prove effective in predicting personnel performance. Two experiments were conducted. In the first, bioelectric data (e.g., event-related brain potentials) and sample biomagnetic data (e.g., event-related fields) obtained from one individual were compared. Results suggest that biomagnetic recordings are more sensitive to biological activity localization than are bioelectric recordings. In the second experiment, multiple serial recordings of visually evoked magnetic fields were taken on five people to obtain waveform topographic maps from the occipital and parietal brain regions. Waveform reliability was determined by signal averaging techniques and by examination of characteristic changes in waveform shape over the maps in comparison to background magnetic noise. The visually evoked field was found to be a multiphasic waveform composed of a short period sinusoidal deflection after about 200 msec. The waveform was observed in both the occipital and parietal regions lateral to the midline. Phase reversals of major deflections occurred between the left and right hemispheres and between the occipital and parietal regions of the right but not left hemisphere. The reliability of the visually evoked field components between 100 and 200 msec. should be adequate for their further use as a predictor of performance. GRA

N84-30698# Federal Aviation Administration, Atlantic City, N.J.
THE MEASUREMENT OF PILOT PERFORMANCE: A MASTER-JOURNEYMAN APPROACH Final Report
E. S. Stein May 1984 113 p

(AD-A142457; FAA/CT-83/15) Avail: NTIS HC A06/MF A01 CSCL 05/9

This project evaluated several methods for measuring pilot performance in a general aviation simulator and examined the relationship between performance and workload. An Automated Performance Measurement (APM) System was designed for use in a flight simulator which was instrumented for digital data collection. Performance rating was accomplished by three independent observers. Workload was assessed using a real-time subjective input system with which pilots provided workload estimates every minute. Two groups of pilots participated in the experiment: ten professional high-time pilots and ten recently qualified instrument pilots. Both the APM and the observer ratings showed significant performance differences between the two pilot groups. The automated technique showed more of a spread, however, among individuals in the professional (masters) group. The newly qualified pilots (journeymen) reported significantly higher workload than their masters counterparts and their performance was significantly worse. Author (GRA)

N84-30699# Educational Testing Service, Princeton, N. J.
SPECULATIONS ON THE FUTURE OF TEST DESIGN
I. I. Bejar Apr. 1984 45 p
(Contract N00014-83-C-0761; RR0-4204)
(AD-A142662; ETS-RR-84-13-ONR) Avail: NTIS HC A03/MF A01 CSCL 05/10

The paper discusses the potential benefits of integrating technology, cognitive science, and psychometric theory. It is argued that even though adaptive testing, as currently implemented, is an important achievement, it will be necessary to pay close attention to the psychological foundation of tests to continue advancing the state of the art. Such an effort requires construct validation in the broadest sense, as well as focusing on items and why they differ with respect to psychometric parameters, especially difficulty. This approach opens the possibility of generating items with better control of their psychometric characteristics and ultimately the development of computer-based tests that are solidly anchored in psychological theory. Author (GRA)

N84-30700# Georgia Inst. of Tech., Atlanta. Center for Man-Machine Systems Research.
A REVIEW OF THE LITERATURE ON TRAINING SIMULATORS. TRANSLATORS: TRANSFER OF TRAINING AND SIMULATOR FIDELITY Technical Report, 1 Jun. 1982 - 31 May 1985
Y. L. D. Su Apr. 1984 83 p
(Contract N00014-82-K-0487)
(AD-A142732; GIT-TR-84-1) Avail: NTIS HC A05/MF A01 CSCL 05/9

This report summarizes and evaluates a number of transfer of training methodologies. Definitions and components of simulator fidelity are discussed. The issue of fidelity measurements is investigated and the relationship between fidelity and training effectiveness is explored. Author (GRA)

N84-30701# Trenton State Coll., N. J.
THE REPRESENTATION OF PART-WHOLE INFORMATION IN MEMORY Final Report
Roger Chaffin Jun. 1983 14 p
(Grant PHS MH-36533)
(PB84-180140; NIMH-83-403) Avail: NTIS HC A02/MF A01 CSCL 05J

This report discusses the part whole relation, the representation of information about parts of objects in memory, and decision processes used to decide whether one thing is part of another were studied. A taxonomy of various kinds of part whole relations, e.g., club member, mile yard, salt grain, car wheel is developed and part whole from other inclusion relations such as class inclusion was distinguished. The organization of parts of objects in memory in a copartonyn judgment task is presented. Also, the processes involved in deciding that one object is part of another is explored. GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N84-30702# Committee on Commerce, Science, and Transportation (U. S. Senate).
CABIN AIR QUALITY
Washington GPO 1984 81 p refs Hearing on S. 197 before the Subcomm. on Aviation of the Comm. on Com., Sci., and Transportation, 98th Congr., 1st Sess., 9 Nov. 1983
(GPO-29-522) Avail: Subcommittee on Aviation

Testimony was heard before the Senate Committee on Commerce, Science, and Transportation, Subcommittee on Aviation, concerning hazards found on commercial aircraft. Specifically, disease transmission, onboard fires and high ozone levels aboard commercial aircraft were discussed. The issue is whether the airlines are doing enough to insure proper passenger safety in hazardous situations in the closed environments of commercial aircraft cabins. A bill is proposed which would direct the Secretary of Transportation to conduct an independent study to determine the adequacy of certain industry practices and Federal Aviation Administration rules and regulations, and for other purposes. S.B.

N84-30703# Technische Hogeschool, Delft (Netherlands). Lab. for Measurement and Control.
MAN-MACHINE SYSTEMS GROUP Progress Report, Jul. 1976 - Dec. 1982
Ton vanLunteren, ed. Sep. 1983 287 p refs
(WTHD-161; PR-4) Avail: NTIS HC A13/MF A01

Supervisory control of industrial processes, fault management, modeling the shoulder girdle for rehabilitation, information processing for use in the treatment of the severely physically handicapped, treatment of patients with brachial plexus lesions, arm prostheses for unilateral amputees, and communication aids for the handicapped are discussed. For individual titles, see N84-30704 through N84-30715.

N84-30704# Technische Hogeschool, Delft (Netherlands).
THE MAN-MACHINE SYSTEMS GROUP
Henk G. Stassen *In its* Man-Machine Systems Group Sep. 1983 p 8-29 (For primary document see N84-30703 20-54)
Avail: NTIS HC A13/MF A01

Research and teaching activities related to man machine systems are summarized. Research projects include manual and supervisory control in industrial systems, and rehabilitation of physically handicapped patients. Control and decision making models were developed. Protheses were tested, and an eyeball position controlled communication system (EPCOS) and lightspot operated typewriter (LOT) were developed. Author (ESA)

N84-30705# Technische Hogeschool, Delft (Netherlands).
SUMMARIES OF DOCTORATE THESES
Wim Veldhuyzen, Ton vanLunteren, Jan Kok, Ron vanWijk, Thijs Soede, and Ton Eland *In its* Man-Machine Systems Group Sep. 1983 p 22-29 (For primary document see N84-30703 20-54)
Avail: NTIS HC A13/MF A01

Research concerning the manual control of ships, the identification of human operator describing function models with one or two inputs in closed loop systems, the evaluation of models describing human operator control of slowly responding complex systems, the mental load in arm prosthesis control, and identification of the adaptive feedback of the human motor system using the response difference method is summarized. Author (ESA)

N84-30706# Technische Hogeschool, Delft (Netherlands).
SUPERVISORY CONTROL: INTRODUCTION AND THEORY
Jan Kok and Jaap vanDieten *In its* Man-Machine Systems Group Sep. 1983 p 30-47 refs (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

A model to describe human operator control of slowly responding complex systems, the observer/controller/decision model, is introduced. Algorithms used to reduce computational complexity and cost in parameter identification are outlined. The experimental design for model testing with a simplified utility plant simulation is described. Author (ESA)

N84-30707# Technische Hogeschool, Delft (Netherlands).

MODELING THE HUMAN OPERATOR'S SUPERVISING BEHAVIOR

Ted White *In its* Man-Machine Systems Group Sep. 1983 p 48-65 refs Sponsored by Netherlands Organization for the Advancement of Pure Research (ZWO) (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

A human supervisor model in which the supervisor acts as a suboptimal controller, taking into account the inherent limitation that his observation of the output process variables can be inaccurate, is discussed. This limitation is modeled by a noise called the observation noise. It is assumed that the human supervisor possesses exact knowledge of the generated control signals. Hence, the model consists of three subsystems: an observer, a controller and a decision making element, with the last one acting on each of the two other subsystems. Relations between task variables (system disturbances, display structure, task requirements, system dynamics) and model parameters were investigated. Author (ESA)

N84-30708# Technische Hogeschool, Delft (Netherlands).

A UTILITY PLANT SIMULATOR FOR CONTROL ROOM EXPERIMENTS

Rolf vanderVeldt and Henk Schneider *In its* Man-Machine Systems Group Sep. 1983 p 66-79 refs Sponsored by Foxboro Co. (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

The extent to which the human supervisor's internal representation is a replica of the actual process and the role of different types of overview displays (historic, status and predictive displays) on the way the human supervisor updates his internal representation are discussed. In order to measure the accuracy of the operator's internal representation and to gain insight into the type of information the operator needs, a simulated utility plant was created. Experiments with and without a predictive display indicate that the simulation is realistic. No differences between the two conditions are reported. Author (ESA)

N84-30709# Technische Hogeschool, Delft (Netherlands).

FAULT MANAGEMENT

Wim Thijs *In its* Man-Machine Systems Group Sep. 1983 p 80-99 refs Sponsored by Organization for Applied Scientific Research TNO and Institute for Mechanical Constructions (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

Cognitive, behavioristic and normative approaches to fault management in industrial processes are outlined. The cognitive approach is descriptive, speculative and very general. The behavioristic approach is descriptive and task specific. The normative approach is prescriptive, and is based on Savage's normative decision theory. This theory concerns the selection of acts out of a set of possible acts in such a way that the expected utility of the consequences is maximized. Possible states of the world, how alternative actions relate consequences to these possible states, and how the gravity of the different consequences may be compared are considered. The uncertainty of these items is expressed in a subjective or personal probability. Author (ESA)

N84-30710# Technische Hogeschool, Delft (Netherlands).

A MODEL OF THE SHOULDER GIRDLE FOR USE IN REHABILITATION

Gijs Pronk *In its* Man-Machine Systems Group Sep. 1983 p 100-124 refs (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

A method to predict the effects of shoulder arthrodesis, and to calculate an optimal fixation position of the humerus with regard to the scapula is discussed. The development of a biophysical-mathematical model describing the kinematics of the shoulder girdle so that the possible range of the hand can be predicted is described. The development of a clinical method to measure externally the mobility of the scapula before a possible omodesis, so that the optimal fixation position can be predicted is summarized. The generation of a set of requirements concerning the possibilities of positioning the hand, based on an analysis of daily life-activities, is outlined. Author (ESA)

N84-30711# Technische Hogeschool, Delft (Netherlands).

INFORMATION PROCESSING FOR USE IN THE TREATMENT OF SEVERELY PHYSICALLY HANDICAPPED PERSONS

Rene Hoogendorn, Han Bakker, Gerrit Jan vanderKolk, Piet Balk, Gerard Morsink, Henk Stassen, and Ton vanLunteren *In its* Man-Machine Systems Group Sep. 1983 p 125-151 refs Sponsored by Ministry of Health and Environment Protection, Rehabilitation Center De Hoogstraat and Ministry of Social Affairs (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

A cybernetic model of the treatment of patients with injuries of the spinal cord was developed. The applicability of an information processing system in a rehabilitation center was studied. Man-computer communication concerning the data involved in the treatment of patients was investigated. The model shows that moment of discharge of patients depends on readiness of home adaptions and availability of specialized equipment. It is possible to construct models which would speed up prognoses, enabling patients to be discharged 10 weeks sooner. A goal-directed information management method based on systems theory proves superior to one designed for materials handling. Author (ESA)

N84-30712# Technische Hogeschool, Delft (Netherlands).

TREATMENT OF PATIENTS WITH A LESION OF THE BRACHIAL PLEXUS

Bert vanHuygevoort, Christ deLouw, and Rob Jaspers *In its* Man-Machine Systems Group Sep. 1983 p 152-168 refs Sponsored by European Social Fund and Ministry of Social Affairs (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

Information processing in a multidisciplinary rehabilitation team for patients with brachial plexus lesions was studied in order to help medical personnel and patients decide if a shoulder arthrodesis should be executed, and if nonomodesis patients will get an elbow orthosis. Results show that it is not possible to apply a simple criterion to the present data in order to clearly separate the groups with and without an indication for an omodesis. For restoring arm function by executing an omodesis, a badly functioning forearm may be a negative indication. Author (ESA)

N84-30713# Technische Hogeschool, Delft (Netherlands).

EVALUATION OF ARM PROTHESES FOR UNILATERAL AMPUTEES

Jaap vanDieten, Thijs Soede (Netherlands Institute for Preventive Health Care), Erna vanLunteren-Gerritsen, Mark Zuithoff, Henk Stassen, and Ton vanLunteren *In its* Man-Machine Systems Group Sep. 1983 p 169-196 refs Sponsored by Fund for Preventive Health Care (For primary document see N84-30703 20-54)

Avail: NTIS HC A13/MF A01

An arm prosthesis was compared with existing models in laboratory and field tasks. Using nonamputees fitted with a device to simulate amputation, technical aspects (such as gripping force and opening width) and task accomplishment, and mental load involved in performing the tasks were investigated. The effect of the prosthesis on real amputees' lives, and the use, benefits, and burdens of the device were examined in a field study. Author (ESA)

N84-30714# Technische Hogeschool, Delft (Netherlands).

PROPRIOCEPTION

Ton vanLunteren, Ton Eland, Dirk Sparreboom, and Kees Ruitenb-

eek *In its* Man-Machine Systems Group Sep. 1983 p 197-243 refs Sponsored by Netherlands Organization for the Advancement of Pure Research (ZWO) (For primary document see N84-30703 20-54)
Avail: NTIS HC A13/MF A01

Two models for step tracking behavior are considered: a describing function model, which is an extension of a continuous pursuit tracking model, and a model based on psychophysiological considerations, which uses an internal model concept. Parameter identification methods applied for these models are discussed. Experiments executed using a manipulator with variable dynamics are summarized. Author (ESA)

N84-30715# Technische Hogeschool, Delft (Netherlands).
COMMUNICATION AIDS FOR THE HANDICAPPED
Henk Stassen, Ed Frietman, and Arjan vanDijk *In its* Man-Machine Systems Group Sep. 1983 p 244-262 refs (For primary document see N84-30703 20-54)
Avail: NTIS HC A13/MF A01

A lightspot operated typewriter (LOT), an eyeball position controlled communication system (EPCOS), and a training aid for use in rehabilitation of aphasia patients were developed. The LOT uses a small lamp fixed to an eye glasses frame to activate light sensitive elements on a control panel, linked to typewriter keys. One subject achieved a typing speed of 100 characters per min after 20 hrs training, the others at least 45 characters per min. The EPOCS is similar to the LOT, but requires microprocessor based control given the difficulty of sensing and transforming eye movements. Typing speed is similar to LOT. The aphasia trainer uses a microcomputer to run word games programs which the patient can use at home. Author (ESA)

N84-30716# Virginia Polytechnic Inst. and State Univ., Blacksburg. Lab. of Human Factors.
OPERATOR PERFORMANCE ON FLAT-PANEL DISPLAYS WITH LINE AND CELL FAILURES
S. R. Abranson and H. L. Snyder Jan. 1984 53 p
(Contract N00014-78-C-0238)
(AD-A142340; VPI-HFL-83-3) Avail: NTIS HC A04/MF A01 CSCL 05/8

This technical report describes the results of an experiment to determine the influence of individual line and cell failures on readability of flat-panel displays. A 1024 x 1024 pixel plasma display was used to present reading passages. Selected percentages of dots or cells were failed (either on or off) randomly within the passage. Reading time for these passages was measured and related to the type of failure, percent failure, character font, and case of the characters (upper and mixed). The results clearly indicate that all these variables have an effect upon readability of the display, but that interactions among the variables are complex and important. Design criteria for displays which are subject to such failures are offered, as are quality assurance criteria. Author (GRA)

N84-30717# Massachusetts Inst. of Tech., Cambridge.
INTERACTION OF HUMAN COGNITIVE MODELS AND COMPUTER-BASED MODELS IN SUPERVISORY CONTROL
T. B. Sheridan Mar. 1984 55 p
(Contract N00014-83-K-0193)
(AD-A142677) Avail: NTIS HC A04/MF A01 CSCL 05/8

This report summarizes the first year's effort of a three-year research project on how knowledge is represented in decision aids and control systems and how the operators of such systems apparently represent and utilize such knowledge. The first section of the report discusses the relationship of computer-based supervisory control to computer-based decision-aiding (expert systems) by identifying component variables and functions and building up block diagrams. The second section deals quantitatively with internal models, knowledge, and calibration, both with respect to expectations of the existence of identifiable states of the world and with respect to the overlap of meanings of terms (mental or linguistic encodings, fuzzy variables). The third section discusses mental models and their importance in three kinds of activities supervisors must do in complex systems: (1) discovering how things work; (2) determining what is wanted out of the set of alternatives states of the attributes; (3) encoding and manipulating fuzzy concepts; (4) combining evidence and confidence; and (5) deciding what to do. The fourth section of the report deals with the human use of computer-based models in automatic control and in decision-aiding. GRA

N84-30718# Kema (N. V.), Arnhem (Netherlands). Risk and Reliability Analysis Group.
HUMAN RELIABILITY ANALYSIS USING EVENT TREES
G. Heslinga 1983 29 p refs Sponsored in cooperation with Delft Technical Univ. and Dodewaard Nuclear Plant, Netherlands (S/T-Rept-Vol-1-No-3; B8464516; ISBN-90-353-0007-6; ISSN-0167-8590) Avail: NTIS HC A03/MF A01

Operator behavior in a technologically complex situation such as a nuclear power plant shutdown is analyzed by making a human reliability analysis event tree (HRA event tree) of each action, breaking down each action into small elementary steps. The application of event trees in human reliability analysis implies more difficulties than in the case of technical systems since the operator is able to recover a wrong performance; memory influences play a significant role. The study shows that although in practice the operator recovers fault partly, theoretically this can be described as starting the whole event tree again. Formulas by which the probability of reaching a specific failure consequence on passing through the HRA event tree after several times of recovery are derived. Author (ESA)

N84-30719# Weston (Roy F.), Inc., West Chester, Pa.
OPERATION AND MAINTENANCE OF SELECTED OZONE AND ULTRAVIOLET DISINFECTION SYSTEMS Final Report, Jun. 1982 - Sep. 1983
R. Junkins May 1984 254 p refs
(Contract EPA-68-03-3019)
(PB84-180124; EPA-600/2-84-087) Avail: NTIS HC A12/MF A01 CSCL 13B

As part of the Environmental Protection Agency's efforts to compile and promulgate design and operational information concerning the use of ozone disinfection of UV light disinfection in place of chlorine disinfection for wastewater effluents, a series of on-site evaluations were conducted at seven municipal wastewater treatment plants that have or are using ozone for the disinfection, five water treatment plants using ozone for disinfection and/or odor control, and three municipal wastewater treatment plants that have used or are using UV disinfection. During these plant visits operating data were reviewed, operational practices observed, and operating personnel were interviewed in order to establish operation and maintenance (O&M) causative factors relating to poor and efficient process performance. The typical O&M problems are listed and the recommended remedial actions necessary to correct those problems are presented. GRA

N84-30676# Joint Publications Research Service, Arlington, Va.
ENGINEERING PHYSIOLOGY: NEW AREA FOR USE OF CONTROL THEORY Abstract Only
V. N. Novoseltsev *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-84-016) 30 Jul. 1984 p 51 Transl. into ENGLISH from Izmereniya Kontrol Avtomatiz. (Moscow), no. 4, 1983 p 55-63 (For primary document see N84-30675 20-51) Copyright. Avail: NTIS HC A06

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N84-30720# California Univ., Livermore. Lawrence Livermore Lab.
REVIEW OF THE THIRD BIENNIAL CONFERENCE ON REAL-TIME COMPUTER APPLICATIONS IN NUCLEAR AND PARTICLE PHYSICS
Dennis W. OBrien Oct. 1983 4 p Presented at the Nucl. Sci. Symp., San Francisco, 17-22 Oct. 1983 Submitted for publication
(Contract W-7405-eng-48)
(DE84-002457; CONF-831015-48; UCRL-89915) Avail: NTIS HC A02/MF A01

The topics emphasize computer technologies and architecture as they effect the data acquisition and data reduction process. Data-acquisition hardware activities are represented with discussions of CAMAC, FASTBUS, and specialized hardware for data sorting, pipelined operations, and parallel process. Systems are demonstrated and new research developments and directions are examined. DOE

N84-30721# Defense Advanced Research Projects Agency, Arlington, Va.
STRATEGIC COMPUTING: NEW-GENERATION COMPUTING TECHNOLOGY: A STRATEGIC PLAN FOR ITS DEVELOPMENT AND APPLICATION TO CRITICAL PROBLEMS IN DEFENSE
28 Oct. 1983 110 p
(AD-A141982) Avail: NTIS HC A06/MF A01 CSCL 09/2

The overall goal of the Strategic Computing Program is to provide the United States with a broad line of machine intelligence technology and to demonstrate applications of the technology to critical problems in defense. This document provides a summary overview of the program structure and goals. The program begins by focusing on demanding military applications that require machine intelligence technology. The applications generate requirements for functions such as vision, speech, natural language, and expert system technology, and provide an experimental environment for synergistic interactions among developers of the new technology. The intelligent functions will be implemented in advanced architectures and fabricated in microelectronics to meet application performance requirements. Thus, the applications serve to focus and stimulate or pull the creation of the technology base. The applications also provide a ready environment for the demonstration of prototype systems as the technology compartments successfully evolve. GRA

N84-30722# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
PERFORMANCE MEASUREMENT IN A DISTRIBUTED PROCESSING ENVIRONMENT Ph.D. Thesis
W. E. Ayen 1984 114 p
(AD-A142410; AFIT/CI/NR-84-10D) Avail: NTIS HC A06/MF A01 CSCL 12/1

A large class of distributed computing environments is emerging. These systems have a common set of distinguishing characteristics which separate them from single processor systems and many other distributed environments, and which must be considered when a measurement facility is designed for the new environments. The fundamental measurement questions of what to measure and how to measure are both impacted by the distribution, and these impacts occur in a number of ways and at various locations in the distributed systems. This dissertation describes the characteristics of a particular class of distributed computing environments and establishes the impact that the characteristics have on the design of a measurement facility for that class. The design of the measurement facility for a specific system in the class is presented. Author (GRA)

N84-30723# Illinois Univ., Urbana. Applied Computation Theory Group.
A MINIMUM AREA VLSI (VERY LARGE SCALE INTEGRATED) ARCHITECTURE FOR O(LOGN) TIME SORTING
G. Bilardi and F. P. Preparata Nov. 1983 28 p
(Contract N00014-79-C-0424)
(AD-A142414; ACT-45; UILU-ENG-83-2227) Avail: NTIS HC A03/MF A01 CSCL 09/2

A generalization of a known class of parallel sorting algorithms is presented, together with a new architecture to execute them. A VLSI implementation is also proposed, and its area-time performance is discussed. It is shown that an algorithm in the class is executable in O(logn) time by a chip occupying O(n2) area. The design is a typical instance of a 'hybrid architecture', resulting from the combination of well-known VLSI arrays as the orthogonal-trees and the cube-connected-cycles; it is also the first known to meet the AT21 = omega(n2log2n) lower bound for sorters of n words of length (1 + epsilon) and working in minimum O(logn) time. Author (GRA)

N84-30724# Naval Research Lab., Washington, D. C.
PROTON-INDUCED SINGLE EVENT UPSETS IN THE SBP9989 MICROPROCESSOR Final Report
L. T. Myers, P. Shapiro, E. L. Petersen, A. B. Campbell, and D. Emily 12 Jun. 1984 28 p
(F12141)
(AD-A142448; NRL-MR-5213) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report describes the investigation of proton-induced single event upsets in the SBP9989 micro-processor fabricated by Texas Instruments, Inc. Ten different devices with various date codes were tested. Total dose failure occurred in five of these devices after 10 to the 12th power protons per sq cm. An average upset cross section of 6 times 10 to the minus 12th power upset-sq cm/proton-device was observed. Comparison with cosmic ray-induced upsets indicates that proton-induced upsets represent a more severe problem for satellites with orbits between 600 and 2500 nautical miles. Author (GRA)

N84-30725# Pattern Analysis and Recognition Corp., New Hartford, N.Y.
REPORT ON FUNCTIONAL DESIGN SPECIFICATION FOR THE AUTOMATED ALPHANUMERIC DATA ENTRY SYSTEM
A. L. Downs and B. Glick 30 Jan. 1984 1813 p
(Contract N00014-83-C-0749)
(AD-A142518; PAR-84-13) Avail: NTIS HC A99/MF A01 CSCL 09/1

The Automated Alphanumeric Data Entry System (AADES) will provide DMA with an integrated system for bulk input of geoname data from maps and hardcopy gazetteers. Maps used as input data sources will include DMA map series and non-DMA maps to generate a geonames file that will be input to the Geographic Names Data Base (GNDB). This file will include information on the geoname, the position of the feature to which the name refers, the feature's designator or class, the source document, the country the named feature is in, the feature's attributes, and non-Romanized name. This report describes existing methods and systems that relates to the AADES objectives and points out their respective deficiencies and strengths. The state of the art in specific hardware and software technology areas is addressed, such as automatic character and word recognition and scanners. A major objective of this report is to examine the functions that must be carried out in the AADES to produce the required geonames file from the input source material. Another objective is to present information that may be useful for comparing alternative hardware and software configurations or scenarios by identifying what the current state of the art can support and what capabilities must be developed. GRA

N84-30726# Army Engineer Topographic Labs., Fort Belvoir, Va.
VOICE INTERACTIVE SYSTEMS TECHNOLOGY (VIST) RESEARCH Interim Technical Report, Oct. 1981 - Sep. 1982
T. F. DeYoung Jan. 1984 41 p
(AD-A142698; ETL-0349) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report discusses the results to date of the VIST research and describes in detail how to make the Interstate Electronics Corp., Voice-Recognition Module and Voice-Synthesis Module work on Hewlett-Packard 1000, Data General Eclipse S-250, and Digital Equipment Corp., PDP-11/45 minicomputers. GRA

N84-30727# California Univ., Livermore. Lawrence Livermore Lab.
SUPERCOMPUTERS: THE NEXT TEN YEARS. A USER'S VIEW
John E. Ranelletti and George A. Michael 6 Feb. 1984 6 p refs Presented at the 4th Jerusalem Conf. on Inform. Technol., Jerusalem, 26 May 1984
(Contract W-7405-eng-48)
(DE84-011072; UCRL-90351; CONF-8405147-1) Avail: NTIS HC A02/MF A01

In a continuing effort to build faster computers, today's hardware architectural designers have turned to Multi-Instruction/Multi-Data machines (MINDs) in order to achieve significant increases in capability. The view of some potential users of such architectures is presented. A total Supercomputing Environment is suggested in order to meet the application needs of the future. DOE

N84-30728# Argonne National Lab., Ill. Mathematics and Computer Science Div.
LOGIC MACHINE ARCHITECTURE INFERENCE MECHANISMS: LAYER 2 USER REFERENCE MANUAL RELEASE 2.0
Ewing L. Lusk and Ross A. Overbeek Apr. 1984 129 p refs
(Contract W-31-109-eng-38)
(DE84-012115; ANL-82-84-Rev-1) Avail: NTIS HC A07/MF A01

Logic Machine Architecture (LMA) is a package of software tools for the construction of inference based systems. This document is the reference manual for layer 2 of LMA. It contains the information necessary to write LMA-based systems at the level of layer 3. Such systems include theorem provers, reasoning compounents for expert systems, and customized deduction componets for a variety of application systems. DOE

N84-30729# California Univ., Livermore. Lawrence Livermore Lab.
COMMUNICATING BETWEEN THE IBM PERSONAL COMPUTER AND THE WANG WORD PROCESSING SYSTEM
Robert M. Downey 15 Mar. 1984 19 p
(Contract W-7405-eng-48)
(DE84-010423; UCID-19889-Rev-1) Avail: NTIS HC A02/MF A01

The steps for transferring documents to a Wang OIS word processor from an IBM Personal computer (PC) and for retrieving stored documents from the Wang are outlined. Hardware and software needed to connect the two systems are discussed, as well as the steps one should take in transferring a document. DOE

N84-30730# Pacific Northwest Lab., Richland, Wash.
A USER-ORIENTED LABORATORY DATA ENTRY COMPUTER SYSTEM DESIGNED TO REDUCE ERRORS
R. A. Peloquin Feb. 1984 7 p Presented at the 17th Midyear Topical meeting of Health Physics Society (HPS), Pasco, 5-9 Feb. 1984
(Contract DE-AC06-76RL-01830)
(DE84-011901; PNL-SA-11565; CONF-840202-25) Avail: NTIS HC A02/MF A01

Data entry computer programs that focus on the user system interface can reduce error, save time, and optimize personnel resources. Feedback from the potential users during the task analysis and throughout the development stage should direct the formation of the computer code. Checking and verification of data, reduction of keystrokes, and in place instructions are some of the techniques that should be utilized. These design principles and techniques are used during the developmet of ENTRY, a data entry computer program used to record data (e.g., sample weights, radiochemical analyses) for a long term field and laboratory study. Extensive data must be collected each year from each of the more than 350 experimental plots used in the study. The data is entered on a MINC-11 microcomputer with two disk drives and less than eight kilobytes of usable memory. Despite the memory restriction, the program demonstrates a wide range of techniques which make it easy to use and consequently reduces the occurrence of errors. DOE

N84-30731# California Univ., Livermore. Lawrence Livermore Lab.
AN OPERATING SYSTEM AND MEMORY SWITCH FOR THE S-1 COMPUTER Report, 26 Apr. 1978 - 31 Dec. 1979
Jeffrey Rubin, Ted Panofsky, Martin Frost, and Marc LeBrun Feb. 1984 2 p
(Contract W-7405-eng-48)
(DE84-013094; UCRL-15606) Avail: NTIS HC A02/MF A01

During this period the Stanford Artificial Intelligence Laboratory worked on many aspects of the S-1 project. These included: (1) the first architectural manual and various features of the architecture, (2) simulator for PDP-10 on S-1, simulator for YUK-7 on S-1, (3) design and debugging of PASCAL compilers and intermediate languages on the S-1, and (4) memory switch for S-1. DOE

N84-30732# California Univ., Livermore. Lawrence Livermore Lab.
THE S-1 MARK IIA SUPERCOMPUTER
P. Michael Farmwald 1983 12 p refs Presented at the NATO Advan. Res. Workshop on High-Speed Computation, Juelich, 20-22 Jun. 1983
(Contract W-7405-eng-48)
(DE84-012374; UCRL-89165; CONF-830685-2) Avail: NTIS HC A02/MF A01

This paper describes the S-1 Mark IIA Multiprocessor System. It is composed of up to 16 supercomputer class uniprocessors with multiple local caches, an extremely large, medium-latency high-bandwidth shared memory, and a low-latency synchronization mechanism for passing short messages. The system is applicable to a wide variety of applications, including large-scale physical simulation, real-time command and control and program development in a time-sharing environment. The hardware organization, its implications, and software supporting the efficient utilization of the multiprocessor are discussed. DOE

N84-30733# Sheffield Univ. (England). Dept. of Control Engineering.
A SIMULATION TECHNIQUE FOR CHECKING THE CIRCLE CRITERION
D. H. Owens and A. Chotai Mar. 1984 12 p refs
(RR-248) Avail: NTIS HC A02/MF A01

It is shown that the circle criterion for single input/single output systems can be checked by simulation means alone to yield a time-domain design aid for cases where frequency domain computations are unnecessary or unfeasible or where design is based on time domain rather than frequency domain computations. Author (ESA)

N84-30734# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
MODULAR COMPUTER SYSTEM, INC. MODULAR NASA EXTENDED FORTRAN 78 C.1 Validation Summary Report

9 Feb. 1984 12 p
(PB84-180231; OIT/FSTC-84/151) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Modular Computer System, Inc., Modular NASA Extended FORTRAN 78 C.1 running under the MAX IV Release H.0 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Subset Level FORTRAN Level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-30735# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
BURROUGHS CORPORATION, B5900, LARGE SYSTEMS COBOL74 3.4.1. Validation Summary Report
18 Jan. 1984 74 p
(PB84-181379; OIT/FSTC-83/325) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Burroughs Corporation, Large Systems COBOL74, Release 3.4.1 running under the III.4 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the High Level level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-30736# System Development Corp., McLean, Va.
GUIDELINE FOR COMPUTER SECURITY CERTIFICATION AND ACCREDITATION. CATEGORY: ADP (AUTOMATIC DATA PROCESSING) OPERATIONS. SUBCATEGORY: COMPUTER SECURITY. FEDERAL INFORMATION PROCESSING STANDARDS Final Report, Jan. 1981 - Sep. 1982
William Neugent and Zella G. Ruthberg 27 Sep. 1983 94 p refs
(FIPS-PUB-102) Avail: NTIS HC A05/MF A01; also available in three ring binder, North American Continent price $6.25; all others write for quote CSCL 09B

This guideline is intended for use by ADP managers and technical staff in establishing and carrying out a program and a technical process for computer security certification and accreditation of sensitive computer applications. It identifies and describes the steps involved in performing computer security certification and accreditation; it identifies and discusses important issues in managing a computer security certification and accreditation program; it identifies and describes the principal functional roles needed within an organization to carry out such a program; and it contains sample outlines of an Application Certification Plan and a Security Evaluation Report as well as a sample Accreditation Statement and sensitivity classification scheme. GRA

N84-30737*# Mitre Corp., McLean, Va. Metrek Div.
GUIDELINES FOR CONTINGENCY PLANNING NASA (NATIONAL AERONAUTICS AND SPACE ADMINISTRATION) ADP SECURITY RISK REDUCTION DECISION STUDIES Final Report
F. G. Tompkins Jan. 1984 64 p refs
(Contract NASw-3425)
(PB84-189836; MTR-83W203) Avail: NTIS HC A04/MF A01 CSCL 09B

Guidance is presented to NASA Computer Security Officials for determining the acceptability or unacceptability of ADP security risks based on the technical, operational and economic feasibility of potential safeguards. The risk management process is reviewed as a specialized application of the systems approach to problem solving and information systems analysis and design. Reporting the results of the risk reduction analysis to management is considered. Report formats for the risk reduction study are provided. GRA

N84-30738# National Weather Service, Garden City, N.Y.
VERIFICATION OF ASYNCHRONOUS TRANSMISSIONS
L. Cedrone Mar. 1984 18 p refs
(PB84-189885; NOAA-NWS-ERCP-19; NOAA-840430010) Avail: NTIS HC A02/MF A01 CSCL 09B

A program is described that was developed as a means for searching multiple message logs to determine the exact times that a product was transmitted on a particular asynchronous circuit. It can also check for receipt of non-AFOS originated products that come into the system from an external source. GRA

N84-30880# Joint Publications Research Service, Arlington, Va.
CONTROL COMPUTER AND AUTOMATION SUBSYSTEM EQUIPMENT IN DELFIN FACILITY Abstract Only
A. P. Allin, Yu. M. Belenkiy, Yu. V. Borzyak, N. Ye. Bykovskiy, V. Ye. Grigoryev, B. S. Gusyatnikov, I. L. Doroshkevich, V. V. Ivanov, A. G. Kuchinskiy, and V. M. Savchenko *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 17 refs Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzimodeystviye Lazernogo Izlucheniya s Termoyadernymi Mishenyami (Moscow), v. 133, 1983 p 19-50
(For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N84-30739# National Bureau of Standards, Washington, D.C. Center for Programming Science and Technology.
COMPUTER SCIENCE AND TECHNOLOGY: REPORT ON APPROACHES TO DATABASE TRANSLATION Final Report
Leonard Gallagher and Sandra Salazar May 1984 88 p refs
(NBS-SP-500-115; LC-84-601055) Avail: SOD HC

Approaches to database translation, candidate interchange forms, and methods for representing the data structures of newly proposed network and relational data models in a form suitable for database interchange are described. Methods for representing other commonly used database structures in terms of the proposed standard structures show that automated database translation is feasible for most currently installed data models. A review of various candidate interchange forms shows that the proposed Data Descriptive File appears to be the best candidate for character representation of nearly all commonly used database data structures. Acceptance of standard data models and general data base interchange forms could produce substantial benefits to data base management systems DBMS users in terms of cost savings and increased flexibility. Subsequent vendor supplied, automated tools for reading and writing database structures into standard forms for interchange would make data sharing between nonhomogeneous installations a convenient and inexpensive operation. M.A.C.

N84-30740# National Bureau of Standards, Washington, D.C. Systems and Software Technology Div.
COMPUTER SCIENCE AND TECHNOLOGY: INTRODUCTION TO SOFTWARE PACKAGES Final Report
Sheila Frankel, ed. Apr. 1984 59 p refs
(NBS-SP-500-114; LC-84-601045) Avail: SOD HC

An introduction to applications software packages is presented. Application areas which are currently suppored by software packages are reviewed and the benefits of software package use versus in house development are discussed. An annotated list of publications is provided which may be useful to potential users of software packages in searching for a package to perform a specific application, and in critically evaluation the merits of different packages. M.A.C.

N84-30741# Naval Postgraduate School, Monterey, Calif.
COMPUTER GRAPHICS ENHANCEMENT FOR COMEL (COMMUNICATIONS ELECTRONICS) M.S. Thesis
M. R. Conrad, Jr. Mar. 1984 112 p
(AD-A141920) Avail: NTIS HC A06/MF A01 CSCL 09/2

COMEL is a communications-oriented war game developed by the Joint Telecommunications Staff Officer's Course at Kessler AFB. The war game was automated by previous thesis students to run on a VAX/VMS computer. This thesis further modified COMEL to eliminate the manual gameboard and totally automate the game using RAMTEK graphic display devices. The game has two portions, an Acquisition Phase and an Operations Phase. In the Acquisition Phase, players budget for research and development, manufacturing, purchase, and operations and maintenance of communications and electronic equipment for a Joint Task Force (JTF). In the Operations Phase, players allocate the available communications and electronic equipment to units, physical locations, or special missions and then direct the employment of the units and equipment in a war game. The programs are written in structured FORTRAN-77, with extensive comments and external documentation. The graphics routines were written using the DI-3000 graphics system. Author (GRA)

N84-30742# Naval Postgraduate School, Monterey, Calif.
IMPROVEMENTS TO SOFTWARE MAINTENANCE METHODS IN REAL TIME EMBEDDED AVIATION FLIGHT SYSTEMS M.S. Thesis
R. B. Upchurch Dec. 1983 90 p
(AD-A141949) Avail: NTIS HC A05/MF A01 CSCL 09/2

Software maintenance costs in Naval Aviation Operational Flight Programs (OFP) are very high and are projected to climb higher in the future. Maintenance costs are high due to poor initial design, limited programmer and system resources, poor documentation, the conditions under which the OFP must operate and the difficulty involved in performing meaningful flight software tests. The primary factors which produce the stated problems with aviation software systems are discussed. The maintenance phase of the software lifecycle model proposed for standard application software systems is contrasted with that for real time, embedded, aviation software systems. A limited set of software tools and methodologies which are currently available and would greatly aid the system engineers tasked with OFP maintenance is proposed. These tools and methodologies center on two areas of flight software maintenance; documentation and testing. The thesis concludes with recommendations for future aviation flight software systems. Author (GRA)

N84-30743# Air Force Logistics Command, Wright-Patterson AFB, Ohio.
NETWORK REPAIR LEVEL ANALYSIS MODEL USER'S GUIDE
L. Briskin Jan. 1984 105 p
(AD-A141991) Avail: NTIS HC A06/MF A01 CSCL 09/2

This user's guide describes a model for determining repair level decisions by considering life cycle maintenance related costs. The model formulates the repair level decision problem as a network analysis problem. This approach was chosen because it explicitly considers the indenture level relationships between items (Line Replaceable Units) and (Shop Replaceable Units) and considers support equipment as a resource shared by a group of items. Although the decision problem is formulated as a cost network it is not necessary for the user to construct the network or manually solve it. This is done by the computer program written for the model. GRA

N84-30744# Naval Postgraduate School, Monterey, Calif.
CHART AND SKETCH: AN INTERACTIVE COMPUTER GRAPHICS PROGRAM M.S. Thesis
J. J. Tschudy, II Mar. 1984 147 p
(AD-A141997) Avail: NTIS HC A07/MF A01 CSCL 09/2

Chart and Sketch is a highly interactive, color, computer graphics program. It is a FORTRAN 77 implementation of the Precision Visual's DI-3000 software package and the RAMTEK RM-9460 Graphic Display System. DI-3000 is an integrated system of device independent, graphics software tools that may be as subroutines in FORTRAN programs. The Sketch option provides for the interactive creation of multi-colored, empty and color-filled graphic images including circles, diamonds, squares, polygons, lines, arcs, sectors and text. Created images may be selectively copied, moved, erased, displayed, and written to or read from selected graphics files. The Chart option allows the creation and display of charts from a file database. Sketch may be used to add graphic images to the displayed chart, which may in turn be written to a graphics file for later recall and display. The program is written is structured FORTRAN 77, with numerous comments so that it can be read, understood, modified and explained with a minimum of effort. Author (GRA)

N84-30745# Army Communications-Electronics Command, Fort Monmouth, N.J. Center for Tactical Computer Systems.
PROCEEDINGS OF THE 2ND ANNUAL CONFERENCE ON Ada (TRADEMARK) TECHNOLOGY
Mar. 1984 142 p Conf. held in Hampton, 27-28 Mar. 1984
(AD-A142403) Avail: NTIS HC A07/MF A01 CSCL 09/2

The Ada programming language was discussed. Emphasis was placed for teaching the language. Real time operation, computer assisted instruction, the programming environment, and the application of Ada to numerical analysis were among the topics discussed. For individual titles, see N84-30746 through N84-30765.

N84-30746# Army Communications-Electronics Command, Fort Monmouth, N.J. Center for Tactical Computer Systems.
THE ARMY Ada (TRADEMARK) EDUCATION PROGRAM
D. J. Turner *In its* Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 1-4 (For primary document see N84-30745 20-61)
(AD-P003414) Avail: NTIS HC A07/MF A01 CSCL 09/2

In behalf of the U.S. Army, CENTACS is pursuing a comprehensive and aggressive Ada program. An important aspect of that program is the development and transfer of public domain Ada educational and training materials which are focused on the needs of the academic, industrial and government communities. This paper provides an overview of the Army's Ada education and training program and summarizes the products and materials which are being produced under contracts with Softech, Inc., New York University and Jersey City State College. Author (GRA)

N84-30747# Softech, Inc., Waltham, Mass.
THE US ARMY MODEL Ada (TRADEMARK) TRAINING CURRICULUM
P. P. Texel *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 5-10 (For primary document see N84-30745 20-61)
(AD-P003415) Avail: NTIS HC A07/MF A01 CSCL 09/2

This paper describes the U.S. Army Model Ada Training Curriculum, developed by Softech, Inc. for the U.S. Army, Ft. Monmouth, N.J. The curriculum consists of individual modules which can be grouped together to form the courses and training plans that best satisfy the needs of specific organizations. The paper describes the modules in terms of content, prerequisites, and status, as of the date of this conference. Finally, the paper addresses how a manager might go about using this curriculum to satisfy the training needs of his organization. Author (GRA)

N84-30748# Softech, Inc., Waltham, Mass.
CONFIGURATION MANAGEMENT WITH THE Ada (TRADEMARK) LANGUAGE
R. M. Thall *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 11-24 system (For primary document see N84-30745 20-61)
(Contract DAAK80-80-C-0507)
(AD-P003416) Avail: NTIS HC A07/MF A01 CSCL 09/2

Three characteristics of large software projects and five basic configuration management capabilities are identified. The design of the Ada Language System (ALS) is then described in terms of these basic capabilities. The ALS is a computer programming support environment for Ada. Author (GRA)

N84-30749# Intermetrics, Inc., Cambridge, Mass.
LEARNING THE Ada (TRADEMARK) INTEGRATED ENVIRONMENT
G. Snyder *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 25-30 (For primary document see N84-30745 20-61)
(AD-P003417) Avail: NTIS HC A07/MF A01 CSCL 09/2

The Ada Integrated Environment (AIE) is designed to be easy to learn and easy to use. It will be powerful, efficient and friendly. This paper describes how these goals are addressed in the design of the Ada compiler, the MAPSE Command Language, and the Program Integration Facility. Plans for future tools are also described. Author (GRA)

N84-30750# Military Academy, West Point, N. Y. Dept. of Geography and Computer Science.
TEACHING Ada (TRADEMARK) AT THE US MILITARY ACADEMY
K. J. Cogan *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 31-34 (For primary document see N84-30745 20-61)
(AD-P003418) Avail: NTIS HC A07/MF A01 CSCL 09/2

A five year history of teaching Ada* with the NYU Ada/Ed translator has evolved into an effective methodology for teaching top-down engineering design simultaneously with a bottom-up presentation of the Ada grammar. With emphasis on embedded hardware systems, students are confronted with successively more difficult design problems which must be written and executed on a VAX-11/780. Exposed to the Ada features of packages, concurrency, generics, and exception handling, students design, write and execute an extensive term project simulating a real-time embedded system using Ada. Projects approach the 1000 lines of source code limitation of the translator. Reusability of code is stressed by importing a previous year's package when feasible. Author (GRA)

N84-30751# Jersey City State Coll., N. J.
EXPERIENCES IN TEACHING Ada (TRADEMARK)
P. Caverly, C. Drocea, P. Goldstein, and D. Yee *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 35-37 (For primary document see N84-30745 20-61)
(AD-P003419) Avail: NTIS HC A07/MF A01 CSCL 09/2

The first Ada course at Jersey City State College was taught three years ago. Since that time, the use of Ada on our campus has expanded considerably. We now offer a variety of Ada courses and applications of Ada have been incorporated into many other computer courses such as Software Engineering and Systems Programming. Under a contract with Fort Monmouth we: (1) have established an Ada Technology Center, (2) have produced two training courses for Army use, (3) are currently developing case study extensions of these courses, and (4) are exploring the feasibility of using CAI for training. We have established a liaison with local industry to explore mutually beneficial ventures and in the near future, expect to offer special seminars for management, scientists, engineers and college faculty. We are also considering ways we can use Ada as a first or second course in the curriculum along with some software engineering concepts. Our goal is to put students in touch with cutting edge technology and realistic problems as soon as possible. Author (GRA)

N84-30752# Hampton Inst., Va.
TEACHING Ada (TRADEMARK) AT HAMPTON INSTITUTE
D. Rudd *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 38-41 (For primary document see N84-30745 20-61)
(AD-P003420) Avail: NTIS HC A07/MF A01 CSCL 09/2

As the use of Ada becomes widespread, colleges and universities can be expected to respond by including courses in Ada in their curriculums. Important considerations will then arise, such as how to organize Ada courses and what should be the contents of such courses. This paper presents a discussion of a one-semester, first course in Ada which was actually taught by the author at Hampton Institute. Author (GRA)

N84-30753# Softech, Inc., Waltham, Mass.
THE CECOM SUMMER FACULTY RESEARCH PROGRAM c80
P. P. Texel *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 42-49 (For primary document see N84-30745 20-61)
(AD-P003421) Avail: NTIS HC A07/MF A01 CSCL 09/2

This paper describes the U.S. Army sponsored Faculty Research and Enhancement program. The Center for Tactical Computer Systems (CENTACS) located at Fort Monmouth, NJ, in support of its goal of fostering Ada expertise within the Historically Black College community, annually provides intensive Ada training for professors of these colleges. This training: (1) provides the professors with the necessary expertise to include Ada within their computer science curriculum as well as, (2) broadens the Department of Defense research community. This paper describes the program and presents some educational issues and interesting Ada errors encountered during the course. Author (GRA)

N84-30754# Pennsylvania State Univ., Middletown.
TEACH Ada (TRADEMARK) AS THE STUDENT'S FIRST PROGRAMMING LANGUAGE? c80
M. S. Richman *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 50-54 (For primary document see N84-30745 20-61)
(AD-P003422) Avail: NTIS HC A07/MF A01 CSCL 09/2

In designing an Ada programming course within our colleges and universities, one of the first issues we must confront is the level of expertise we shall set as prerequisite to the course. Ada is a very rich and complex language. Must the student have experience with some other high order language in order to appreciate Ada? The speaker contends that programming in Ada can be taught in a meaningful way to the neophyte and, in fact, there are decided advantages inherent in learning Ada as a first language. Some suggestions are offered for coping with the size and complexity of Ada. Author (GRA)

N84-30755# Hughes Aircraft Co., Fullerton, Calif.
AN ADA (TRADEMARK) NETWORK: A REAL-TIME DISTRIBUTED COMPUTER SYSTEM c62
D. S. Lane, G. Huling, and B. M. Bardin *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 55-61 (For primary document see N84-30745 20-61)
(AD-P003423) Avail: NTIS HC A07/MF A01 CSCL 09/2

This paper reports on a prototype real-time distributed computer system which will be implemented in Ada. The goals of the Ada network are to support transparent distribution of application software and incremental growth, and to provide fault tolerant capabilities. Some of the motivations and methods for distributing software in a local network of communicating processors are discussed, in addition to the hardware configuration and software development facilities. The model of distributed Ada programs is then described. After the prototype software is implemented, the project will focus on assessing the performance characteristics of the network: specifically, on distribution, executive software, and Ada language overheads. Author (GRA)

N84-30756# GTE Systems Group, Phoenix, Ariz.
DCP (DISTRIBUTED SOFTWARE ENGINEERING CONTROL PROCESS): EXPERIENCE IN BOOTSTRAPPING AN Ada (TRADEMARK) ENVIRONMENT
S. Parish and A. Rudmik *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 62-69 (For primary document see N84-30745 20-61)

(Contract MDA903-83-C-0202)
(AD-P003424) Avail: NTIS HC A07/MF A01 CSCL 09/2

This paper describes our experiences in developing a Distributed Software Engineering Control Process (DCP). The DCP is a portable distributed Ada programming support environment that provides centralized project management and control facilities integrated with an off-the-shelf Ada compiler and associated development tools. A goal of the DCP is to support the reuse of Ada programs and packages. This capability is supported in part by the DCP database which maintains descriptions of Ada packages and can be used to locate packages for reuse. An Ada PDL and methodology is being developed to support the development of reusable programs and packages as well as a methodology for building programs from existing packages. The goal of DCP portability is addressed by building virtual interfaces to the user, the database and the host environment. The development methodology supported by the DCP is being used to develop the DCP, thereby bootstrapping itself. The methodology is currently supported by manual controls and procedures, but as the DCP capabilities are realized, they will be replaced by automated controls and procedures. Author (GRA)

N84-30757# Intellimac, Inc., Rockville, Md.
Ada (TRADEMARK) FOR BUSINESS AND OTHER NON-DOD APPLICATIONS
R. E. Crafts *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 70-73 (For primary document see N84-30745 20-61)
(AD-P003425) Avail: NTIS HC A07/MF A01 CSCL 09/2

A primary motivation for the U.S. Department of Defense in sponsoring Ada, was to provide a common portable computer language for real-time military embedded computer systems. Ada incorporates many features and characteristics that are also appropriate for commercial, non-DoD applications. This paper will discuss some field-proven Ada business applications, ongoing commercial Ada efforts, the benefits derived from using Ada in this environment, and the potential for future commercial and business-oriented Ada applications. Author (GRA)

N84-30758# Harris Corp., Melbourne, Fla. Government Information Systems Div.
EXPERIENCE WITH Ada (TRADEMARK) FOR THE GRAPHICAL KERNEL SYSTEM
K. A. Gilroy *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 74-85 (For primary document see N84-30745 20-61)
(AD-P003426) Avail: NTIS HC A07/MF A01 CSCL 09/2

This paper describes the effort to produce an Ada language binding to the Graphical Kernel System (GKS) and to implement a subset of the GKS functionality in Ada. It presents an overview of the GKS/Ada project, discusses some of the issues raised during development of the GKS software, describes the results of a post-coding analysis comparing the binding and prototype code, and comments on the lessons drawn from this experience. Author (GRA)

N84-30759# RCA Government Systems Div., Moorestown, N. J. Missile and Surface Radar.
MILITARY COMPUTER FAMILY OPERATING SYSTEM: AN Ada (TRADEMARK) APPLICATION c62
F. E. Wuebker *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 86-88 (For primary document see N84-30745 20-61)
(AD-P003427) Avail: NTIS HC A07/MF A01 CSCL 09/2

The Military Computer Family Operating System (MCFOS) Program is an interesting Ada* application effort. Not only will the operating system be one of the early Ada applications, but it is also an Ada operating system for a new family of machines and is designed to support fielded, real-time Ada applications programs. Finally, the operating system will be the first Ada program designed to be a formally verified multilevel secure system. This ambitious but completely do-able program will certainly stretch the state of the art of Ada programming, if not actually advance it. This paper explores some of the Ada issues that have a major impact on the MCFOS program. Author (GRA)

N84-30760# TRW, Inc., Redondo Beach, Calif.
AN ADVANCED HOST-TARGET ENVIRONMENT FOR THE MILITARY COMPUTER FAMILY
H. Hart, R. Hart, and I. Muennichow *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 89-101 (For primary document see N84-30745 20-61)
(AD-P003428) Avail: NTIS HC A07/MF A01 CSCL 09/2

As part of the Military Computer Family Operating System (MCFOS) project, extensions to the Ada Language System (ALS) are being constructed which allow software for the MCF computers to be developed and tested in a host/target environment. These extensions are collectively known as the ALSE. ALS facilities are used for editing, compiling, linking, and exploring Ada programs, while ALSE facilities are used to download the software into a connected MCF computer and execute the software on the MCF, thus providing state-of-the-art high level debugging and performance monitoring facilities in an embedded target environment. This paper describes the components of the ALSE from a user viewpoint, concentrating on how an applications programmer would use MCFOS and the Extended Ada Language System to develop software. Author (GRA)

N84-30761# Youngstown State Univ., Ohio. Dept. of Mathematical and Computer Sciences.
Ada (TRADEMARK) TASKING IN NUMERICAL ANALYSIS c64
J. J. Buoni *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 104-108 (For primary document see N84-30745 20-61)
(AD-P003429) Avail: NTIS HC A07/MF A01 CSCL 12/1

Recently the interests in the use of iterative methods for the solution of Partial Differential Equations has been revived. Also, the advent of multiprocessor computer systems, will lead many to reformulate much of the existing theory of numerical analysis. It is felt that Ada's portability and rich resources will play an important role in this rekindled interest. The purpose of this paper is to discuss three different implementations of a classical iterative methods for the solution of a numerical problem using several Ada tasks. Author (GRA)

N84-30762# RCA Government Systems Div., Moorestown, N. J. Missile and Surface Radar.
Ada (TRADEMARK) AS A PROGRAM DESIGN LANGUAGE: HAVE THE MAJOR ISSUES BEEN ADDRESSED AND ANSWERED?
R. M. Blasewitz *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 111-114 (For primary document see N84-30745 20-61)
(AD-P003430) Avail: NTIS HC A07/MF A01 CSCL 09/2

Department of Defense requirements to use the higher order language Ada will create challenges to developers of military software that encompass these major concerns: (1) developing a core of Ada software personnel, (2) achieving productivity and software gains that have been targeted as Ada life-cycle objectives, and (3) transitioning to a language that embodies a capability to express software solutions eloquently, clearly, reliably and efficiently. Ada is more than a programming language, it is the basis for a modern perspective of software design and engineering. The IEEE working group on Ada as a PDL has been addressing the issues involved with the use of Ada as a design mechanism for nearly two years. This working group has recently generated a draft guideline that addresses the key issues. The extent of industry's involvement with Ada PDLs and the status and final form of the IEEE product will substantially impact both the acceptance of the Ada language and the efficiency and correctness of its use. Author (GRA)

N84-30763# Harris Corp., Melbourne, Fla.
Ada (TRADEMARK) DESIGN LANGUAGE CONCERNS
J. K. Grau and E. R. Comer *In* Army Communications-Electronics

Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 115-124 (For primary document see N84-30745 20-61)
(AD-P003431) Avail: NTIS HC A07/MF A01 CSCL 09/2

This paper examines key language concerns regarding Ada Design Languages (DL's) in regard to: life cycle applicability; the information expressed by an Ada DL; relationship of an Ada DL to the Ada language; extensions of the Ada language through structured commentary and annotation; and the relationship between methodology and Ada Design Language. An assessment is made of the relative maturity of Ada DL's and of the obstacles to successful development of an Ada DL standard. Author (GRA)

N84-30764# Telesoft, San Diego, Calif.
SEEDING THE Ada (TRADEMARK) SOFTWARE COMPONENTS INDUSTRY
K. Bowles *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 125-126 (For primary document see N84-30745 20-61)
(AD-P003432) Avail: NTIS HC A07/MF A01 CSCL 09/2

The principal aim of the Ada effort is economic - particularly the enhancement of designer/programmer productivity in all parts of the software life-cycle. A shift in system design practice to widespread use of off-the-shelf large scale Ada software components would result in productivity gains exceeding a factor of ten - far more than likely to result from use of productivity enhancing software tools. To achieve widespread use of off-the-shelf Ada components requires establishment of a software components industry, and a shift in attitudes about education of system designers to use Ada. This paper reviews progress to date. Author (GRA)

N84-30765# Tuskegee Inst., Ala.
OPERATING SYSTEM INTERFACE FOR Ada (TRADEMARK) INSTRUCTORS c60
D. C. Fuhr *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 132-137 (For primary document see N84-30745 20-61)
(AD-P003433) Avail: NTIS HC A07/MF A01 CSCL 09/2

Effective use or teaching of a programming language requires more than facility with the language itself. It is also necessary to deal with the computer as personified by the operating system. The LOGIN procedure is only the first handshake with the system. After a successful LOGIN, the system will just stare back stupidly from the CRT until one enters a command the system knows how to handle. The information regarding the options available at this point fills about six shelf-inches of reference books, and is completely understood by about the same proportion of users as the Ada Language Reference Manual. As with any language however, it is possible rather quickly to learn to enable one to get around without embarrassment. Hopefully, the following information will assist users in dealing with the Digital VAX/VMS operating system. Author (GRA)

N84-30766# Softech, Inc., Waltham, Mass.
INTEGRATED COMPUTER-AIDED MANUFACTURING (ICAM) ARCHITECTURE, PART 3. VOLUME 5: COMPOSITE FUNCTION MODEL OF MANUFACTURE PRODUCT (MFG0) Final Interim Technical Report, Sep. 1980 - Oct. 1982
S. Smith, T. Ruegsegger, and W. St.John Wright-Patterson AFB, Ohio AFWAL Sep. 1983 309 p
(Contract F33615-80-C-5109)
(AD-A142337; Rept-1080-34; AFWAL-TR-82-4063-Vol-5) Avail: NTIS HC A14/MF A01 CSCL 09/2

The Integrated Computer Aided Manufacturing (ICAM) Architecture Part 3 was initiated to maintain and update the existing manufacturing architecture as well as develop training courses to assist in the transition of IDEF applications, concepts and procedures to other Air Force programs. This volume, Volume 5, presents the composite view depicting manufacturing as it exists today in the form of an 'AS IS' Function Model of Manufacturing. Author (GRA)

N84-30767# Softech, Inc., Waltham, Mass.
Ada (REGISTERED TRADEMARK) TRAINING CURRICULUM. SOFTWARE ENGINEERING FOR MANAGERS. M101: TEACHERS EXERCISE GUIDE
May 1984 24 p
(Contract DAAB07-83-C-K514)
(AD-A142429) Avail: NTIS HC A02/MF A01 CSCL 09/2

The manner in which different goals effect software engineering and the resulting software is illustrated through a variety of exercises. Systems are described visually and verbally, with the students required to rebuild the structure within a specified time limit. M.A.C.

N84-30768# Softech, Inc., Waltham, Mass.
Ada (REGISTERED TRADEMARK) TRAINING CURRICULUM. Ada (REGISTERED TRADEMARK) FOR SOFTWARE MANAGERS, L201. TEACHERS' GUIDE: VOLUME 1
May 1984 245 p 2 Vol.
(Contract DAAB07-83-C-K514)
(AD-A142430) Avail: NTIS HC A11/MF A01 CSCL 05/9

Course outline for the 3 days. Section 1, is a refresher on a basic Ada system; sections 2-16 present each Ada feature in greater detail with short exercises interspersed; section 17, then uses this Ada knowledge in a larger exercise aimed at Ada design and code assessment; section 18, formalizes the discoveries of section 17; and section 19, summarizes the entire course by putting Ada into its primary design purpose: more reusable and portable software. GRA

N84-30769# Softech, Inc., Waltham, Mass.
Ada (REGISTERED TRADEMARK) TRAINING CURRICULUM. Ada (REGISTERED TRADEMARK) FOR SOFTWARE MANAGERS, L201. TEACHERS GUIDE: VOLUME 2
May 1984 314 p 2 Vol.
(Contract DAAB07-83-C-K514)
(AD-A142431) Avail: NTIS HC A14/MF A01 CSCL 05/9

The training curriculum for Ada is described and directed towards the instruction of software managers. Topics include Tasks: Generics; Input/output; Exceptions; Stubbing; Visibility and Scope; Overloading; Pragmas; Low-Level Features; and Summary of Uses of Ada Features. M.A.C.

N84-30770# Softech, Inc., Waltham, Mass.
Ada (REGISTERED TRADEMARK) TRAINING CURRICULUM. SOFTWARE ENGINEERING FOR MANAGERS. M101: TEACHERS GUIDE
May 1984 355 p
(Contract DAAB07-83-C-K514)
(AD-A142432) Avail: NTIS HC A16/MF A01 CSCL 05/9

The training curriculum for the improvement of software through optimized software engineering is presented. Topics include Background; Software Engineering and Its Goals; Achieving Software Engineering Goals; and Software Engineering and Ada. M.A.C.

N84-30771# Naval Research Lab., Washington, D. C.
PROTON-INDUCED SINGLE EVENT UPSETS IN 71 EARTH-SATELLITE ENVIRONMENTS
W. L. Bendel 14 Jun. 1984 41 p
(AD-A142435; NRL-MR-5364) Avail: NTIS HC A03/MF A01 CSCL 09/2

Predicted upset rates are presented, as a function of one experimental parameter, for devices in small Earth satellites. Contour maps of SEU rate versus circular orbit inclination and altitude allow predictions at 180-1400 km and 27 deg to 90 deg. A computer program is listed, permitting the reader to calculate upsets in any proton flux. Author (GRA)

N84-30772# University of Southern California, Marina del Rey. Information Sciences Inst.
GRAPHICS LANGUAGE, VERSION 2.2
R. Bisbey, II, D. Hollingworth, and B. Britt May 1984 87 p
(Contract MDA903-81-C-0335)

(AD-A142438; ISI/TM-80-18.1) Avail: NTIS HC A05/MF A01 CSCL 09/2

This document defines the language interface to Version 2.2 of a device-independent graphics system intended to facilitate the use of graphics in the command and control environment. The system homogeneously supports graphics terminals of widely varying capability, configured with one or more different programs running on separate computers connected via a C2 communications network. These include both calligraphic and bit-map displays as well as plotters. The set of graphics primitives defined here provides a core upon which device-independent application-tailored graphics packages can be built. Advanced graphics features such as color, shading, and input from multiple devices are supported in a manner that permits use of the same application program with devices not supporting those features. The graphics system performs the appropriate feature mapping to support the connected display device. For example, an application program may specify the color of a line segment. The system maps the specified color into some suitable color supported by the device or, in the case of a monochromatic display, into the single color of that device. An inquiry capability is also provided, permitting the application program to determine the characteristics of the connected display device and fully exploit all of its capabilities. Author (GRA)

N84-30773# Massachusetts Inst. of Tech., Cambridge.
AN ALGORITHM FOR PARSING FLOW GRAPHS
D. C. Brotsky Mar. 1984 152 p
(Contract N00014-80-C-0505)
(AD-A142440; AI-TR-704) Avail: NTIS HC A08/MF A01 CSCL 12/1

This report describes research about flow graphs - labeled, directed, acyclic graphs which abstract representations used in a variety of Artificial Intelligence applications. Flow graphs may be derived from flow grammars much as strings may be derived from string grammars; this derivation process forms a useful model for the stepwise refinement processes used in programming and other engineering domains. The central result of this report is a parsing algorithm for flow graphs. Given a flow grammar and a flow graph, the algorithm determines whether the grammar generates the graph and, if so, finds all possible derivations for it. The author has implemented the algorithm in LISP. The intent of this report is to make flow-graph parsing available as an analytic tool for researchers in Artificial Intelligence. The report explores the intuitions behind the parsing algorithm, contains numerous, extensive examples of its behavior, and provides some guidance for those who wish to customize the algorithm to their own uses. Author (GRA)

N84-30774# Softech, Inc., Waltham, Mass.
INTEGRATED COMPUTER-AIDED MANUFACTURING (ICAM) ARCHITECTURE. PART 3, VOLUME 4: COMPOSITE INFORMATION MODEL OF DESIGN PRODUCT (DES 1) Final Report, Sep. 1980 - Oct. 1982
C. Martin and S. Smith Wright-Patterson AFB, Ohio AFWAL Sep. 1983 195 p
(Contract F33615-80-C-5109)
(AD-A142447; Rept-1080-33-Vol-4; AFWAL-TR-82-4063-Vol-4) Avail: NTIS HC A09/MF A01 CSCL 09/2

The Integrated Computer Aided Manufacturing (ICAM) Architecture Part 3 was initiated to maintain and update the existing manufacturing architecture as well as develop training courses to assist in the transition of IDEF applications, concepts and procedures to other Air Force programs. This volume, Volume 4, presents the composite view depicting the design process as it exists today in the form of an 'AS IS' Information Model of Design. Author (GRA)

N84-30775# Naval Research Lab., Washington, D. C.
MODIFICATIONS TO ITERATIVE RECURSION UNFOLDING ALGORITHMS AND COMPUTER CODES TO FIND MORE APPROPRIATE NEUTRON SPECTRA Final Report
K. A. Lowry and T. L. Johnson 6 Jun. 1984 36 p
(S15-80)
(AD-A142475; NRL-MR-5340) Avail: NTIS HC A03/MF A01 CSCL 06/18

Modifications were made to iterative recursion unfolding algorithms and computer codes which allow the incorporation of prior knowledge, such as cutoff energy or preferred spectral shape, into the solution. Using these modifications, more appropriate neutron spectra are obtained. Author (GRA)

N84-30776# Stanford Univ., Calif. Information Systems Lab.
NEW ADAPTIVE PROCESSOR FOR COHERENT SIGNALS AND INTERFERENCE
T. J. Shan and T. Kailath Mar. 1984 5 p
(Contract F49620-79-C-0058; Grant AF-AFOSR-0228-83)
(AD-A142638; AFOSR-84-0517TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

In this paper we introduce a new adaptive processor able to work well even when the desired signal and the interference are coherent. The present adaptive processors fail to operate in these cases. The results of simulations appear to confirm the theoretical predictions. Author (GRA)

N84-30777# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
A SUMMARY OF FAULT TOLERANT COMPUTING RESEARCH AT CARNEGIE MELLON UNIVERSITY Interim Report
D. P. Siewiorek May 1984 35 p
(Contracts N00014-77-C-0103; DASG60-80-C-0057)
(AD-A142707; CMU-CS-84-123) Avail: NTIS HC A03/MF A01 CSCL 09/2

Spurred by increased system complexity, critical application areas, and increased personnel costs, fault tolerant computing systems are rapidly becoming desirable if not necessary. This report summarizes the accomplishments of the past five years in: data collection on hard and transient faults from a variety of systems including Cm* (a 50 processor multiprocessor), PDP-10 timesharing systems, VAX-11 timesharing systems. C.mmp (a 16 processor multiprocessor), and C.vmp (a triplicated multiprocessor); modeling; experimentation; tools and techniques; and architecture. Author (GRA)

N84-30778# Sandia Labs., Albuquerque, N. Mex.
QUALITY ASSURANCE (QA) PROCEDURES FOR COMPUTER SOFTWARE IN DEPARTMENT 1510
M. E. Fewell, D. K. Gartling, C. M. Korbin, A. J. Russo, and C. E. Sisson Feb. 1984 27 p refs
(Contract DE-AC04-76DP-00789)
(DE84-012131; SAND-84-0311) Avail: NTIS HC A03/MF A01

The Quality Assurance (QA) plan for Department 1510 is described and all standards, requirements and participant responsibilities for its implementation are provided. DOE

N84-30779# California Univ., Livermore. Lawrence Livermore Lab.
BOND GRAPH TIME SIMULATIONS USING EXTRACTED MODAL PARAMETERS FROM THE NOVA SPACEFRAME M.S. Thesis
J. W. Pastrnak 27 Jan. 1984 174 p refs
(Contract W-7405-eng-48)
(DE84-010918; UCRL-53525) Avail: NTIS HC A08/MF A01

Bond graphs are a convenient way of representing the energy exchange, storage, and dissipation mechanisms for interacting energetic systems. One major advantage for using bond graphs to model physical systems is that the governing state equations are always in first order form and can usually be integrated fairly easily with today's modern digital computers. A procedure for simulating the dynamics of a large inherently distributed structure is demonstrated which uses bond graph modeling techniques and incorporates a limited number of normal modes previously measured from an experimental modal analysis. DOE

N84-30780# Los Alamos Scientific Lab., N. Mex.
INTERFACING CAMAC TO A HIGH-SPEED MULTIPROCESSOR BIT SLICE DATA-ACQUISITION SYSTEM
C. Geisik 1984 8 p refs Presented at 6th Ann. Ideas in Sci.

and Engr. Exposition and Symp., Albuquerque, 2 May 1984
(Contract W-7405-eng-36)
(DE84-009986; LA-UR-84-1047; CONF-8405131-4) Avail: NTIS HC A02/MF A01

A CAMAC interface was designed to handle communications with three advanced microdevices AMD-2900-family bit-slice computers operating in parallel. The entire system is used to do preliminary data compection for a high-precision muon decay experiment. The interface allows any computer, using standard CAMAC commands, to control and communicate with the bit-slice computers, including interrupts both ways and data transfers using direct-memory access with either single reads or Block-Mode transfers. Provision is also made for the future addition of a fourth bit slice that may share control of the other three. DOE

N84-30781# Energy Systems Group, Inc., Atlanta, Ga.
SLR-PLUS VERSION 1.0 REFERENCE MANUAL
Feb. 1984 68 p refs
(Contract DE-AC02-82CH-10122)
(DE84-009180; DOE/CH-10122/11) Avail: NTIS HC A04/MF A01

The SLR-PLUS program predicts the heating benefits and subsequent cooling loads of passive solar energy systems. The heating performance of the passive is based on the method presented in Volume 2 of the Passive Solar Design Handbook using the expanded performance correlations given in Volume 3 of the Passive Solar Design Handbook. The cooling loads of passive systems are estimated using the method developed by A. Lau and reported separately by ESG, Inc. The details of the calculation procedures and individual algorithms used to determine the passive system heating and cooling loads are given. Although it is not possible to present every calculation in detail, sufficient information is provided to show the proper interaction between the various program input parameters. The accuracy of the calculation procedures and of the intermediate algorithms are given where possible. The source code listing is included. DOE

N84-30782# Sandia Labs., Albuquerque, N. Mex. Applied Mathematics Div.
SLATEC MATHEMATICAL SUBPROGRAM LIBRARY, VERSION 2.0
Walter H. Vandevender Apr. 1984 19 p refs
(Contract DE-AC04-76DP-00789)
(DE84-010750; SAND-84-0281) Avail: NTIS HC A02/MF A01

The SLATEC Common Mathematical Subprogram Library is an experiment in resource sharing by the computing departments of several Department of Energy Laboratories. The objective is to cooperatively assemble and install at each site a mathematical subprogram library characterized by portability, good numerical technology, good documentation, robustness, and quality assurance. The result is a portable FORTRAN mathematical subprogram library of over 160,000 lines of code. Much of the following report is based on Reference 1, a chapter to be included in a forthcoming book about mathematical software. DOE

N84-30783# California Univ., Berkeley. Lawrence Berkeley Lab.
ENHANCEMENTS TO THE CODATA DEFINITION LANGUAGE
J. L. McCarthy Feb. 1982 30 p refs
(Contract DE-AC03-76SF-00098)
(DE84-010579; LBL-14083) Avail: NTIS HC A03/MF A01

This memo outlines a number of proposed enhancements to the current codata data definition language (DDL) for SEEDIS. At present, the codata DDL is used in data definition files (DDF's) to describe both fixed format, character image codata files and binary format SEEDIS Compressed data files. The basic enhancement proposed here is that the process of adding and changing metadata definitions be made easier (and less hardwired) than it has been in the past. Specific enhancement are also proposed to facilitate handling 1980 Census Project data files, including multidimensional data elements, dimension descriptions, and differentiated labelling components. DOE

N84-30784# California Univ., Berkeley. Lawrence Berkeley Lab.
WC USER'S GUIDE
Shlomo Wald and Peter Countryman (Stanford Univ.) Feb. 1984 192 p
(Contracts DE-AC03-76SF-00098; DE-AM03-76SF-00326)
(DE84-009242; LBL-PUB-3038) Avail: NTIS HC A09/MF A01

WC is an interactive code for analyzing (or simulating) multiparameter experiments. It enables the user to perform complex manipulations of the data on an event-by-event basis, generate output tapes, and display results (as tables or graphs) in a variety of formats. Many powerful features can be invoked interactively, such as definition of one and two dimensional (free-form) gates, certain kinds of pseudo-parameters, spectrum definitions (gated or otherwise) and virtual displays (also gates). Still more complex operations can be done on an event-by-event basis by means of a subroutine which can be modified to the user's specifications and linked to the body of the program. Operations can be made with ease upon the accumulated spectra, including chi(2) fits of various functions to the one-dimensional spectra. The spectra produced and the fits can also be plotted. DOE

N84-30785# Sandia Labs., Albuquerque, N. Mex.
SOFTWARE QUALITY ASSURANCE PROGRAMS: KEY ELEMENTS OF CONCERN IN SELECTED COMMERCIAL APPROACHES
Sharon L. Sardalos 1984 5 p Presented at the 6th Ann. Ideas in Sci. and Eng. Exposition and Symp., Albuquerque, N. Mex., 2 May 1984
(Contract DE-AC04-76DP-00789)
(DE84-009486; SAND-84-0765C; CONF-8405131-1) Avail: NTIS HC A02/MF A01

Emphasis is now being placed on quality and reliability aspects of software. It is generaly agreed that software quality assurance is becoming one of the most important aspects of computer applications. This paper examines several software development industries and their practical approaches to this elusive issue. DOE

N84-30786# Argonne National Lab., Ill.
GUIDE TO GRAPHICS AT ANL, REVISED
Richard M. Bertrand, Bruine R. Hack, David M. Malon, and Clifford Caruthers Apr. 1984 182 p refs
(Contract W-31-109-eng-38)
(DE84-013189; ANL/TM-335-Rev) Avail: NTIS HC A09/MF A01

A general reference guide to doing graphics at Argonne National Laboratory is presented. It should be used along with documents which describe the use of specific graphics software or operating systems. The guide describes the current graphics environment including the hardware, the software, and the procedures needed to write and run programs that produce graphics. While the majority of the material presented documents production of graphics on the central IBM computers, production of graphics on divisional VAX computers is also discussed. DOE

N84-30787# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
FORTRAN 8x: THE SCIENTIFIC PROGRAMMING LANGUAGE OF THE FUTURE
Neldon H. Marshall 13 Apr. 1984 34 p Presented at the FORTRAN Forum, Geneva, 13 Apr. 1984
(Contract DE-AC07-76ID-01570)
(DE84-012526; EGG-M-06084; CONF-8404165-1) Avail: NTIS HC A03/MF A01

The draft standard is known as FORTRAN 8x because it is anticipated that it will be completed in the 1980's, but the exact year is not yet known. There have been many changes proposed for FORTRAN 8x, and many of them will seem like a radical change for FORTRAN, but all of them are functions which have been tried before. The final language will partly bridge the gap between FORTRAN 77 and languages such as PASCAL, PL/1, ALGOL 68, MODULA and Ada while retaining FORTRAN's unique advantages. Despite the extent of the revision, there will be few totally new and untried features added. What is described may seem radical to programmers using the present standard unless they have also tried the newer languages. DOE

N84-30788# Sandia Labs., Albuquerque, N. Mex.
GRAPHICS WORKSTATION SWITCHING UNIT
David B. Baldwin Mar. 1984 28 p
(Contract DE-AC04-76DP-00789)
(DE84-011626; SAND-83-1670) Avail: NTIS HC A03/MF A01

The capability to operate a computer/aided design workstation from a number of different computer processor systems is required. In the past this was accomplished by separately recabling the terminal to another central processing unit (CPU). A Graphics Workstation Switching Unit is described that eliminates the necessity to recable a terminal in order to connect it to another CPU. This unit is capable of switching 10 workstations between 2 CPUs. DOE

N84-30789# California Univ., Livermore. Lawrence Livermore Lab.
LINEAR SYSTEMS ANALYSIS PROGRAM USER'S MANUAL, VERSION 2.2 (VAX/VMS)
Charles J. Herget and Diane M. Tilly 20 Apr. 1984 77 p refs
(Contract W-7405-eng-48)
(DE84-012230; UCID-30184-Rev-1) Avail: NTIS HC A05/MF A01

The computer program LSAP (Linear Systems Analysis Program) is an interactive program with graphics capability that can be used for the analysis and design of linear control systems. Nearly all classical design tools are available, including manipulation of transfer functions and generation of root locus, time response, and frequency response plots. The program is capable of working with both continuous time systems and sampled data systems. For continuous time systems, the Laplace transform is used, and for sampled data systems, the Z-transform is used. The capability of converting from a Laplace transform to a Z-transform is provided. DOE

N84-30790# Centro Informazioni Studi Esperienze, Milan (Italy).
GAME: AN INTERACTIVE GRAPHIC SYSTEM FOR AUTOMATIC MESH GENERATION
E. Bon, M. Casanova, and G. Grassi 1984 12 p refs Presented at 6th Intern. Conf. and Exhibition on Computers in Design Eng. CAD '84, Brighton, England, 3-5 Apr. 1984
(CISE-2211) Avail: NTIS HC A02/MF A01

A graphic interactive mesh generator (GAME) for two-dimensional structural analysis based on finite element methods is described. User interface, geometric modeling and mesh generation and editing are discussed. Author (ESA)

N84-30791# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
THREE IMAGE COMPRESSION ALGORITHMS FOR COMPRESSION AND DECOMPRESSION OF IMAGING SENSOR SIGNALS (CADISS)
W. C. Huisman May 1983 17 p refs Presented at 4th Symp. of Inform. Theory in the Benelux, Leuven, Belgium, 26-27 May 1983
(Contracts ESTEC-5047/82/NL-HP; NIVR-1987)
(NLR-MP-83027-U) Avail: NTIS HC A02/MF A01

Algorithms which can operate in a fixed error mode giving data compression with a fixed distortion (RMS) as well as a fixed compression mode with a variable distortion in compression and decompression of imaging sensor signals (CADISS) are described. The first is a modified Melzer algorithm: instead of estimating several variances, the standard deviations are estimated and the Max quantizers for normal distributed random variables are replaced by equal step quantizers giving a more predictable reconstruction error. The second algorithm is simpler than the first. In the third algorithm a fully reversible mode is present, i.e., image reconstruction without error. Author (ESA)

N84-30792# Center for Mathematics and Computer Science, Amsterdam (Netherlands). Dept. of Numerical Mathematics.
GUIDELINES FOR THE DESIGN OF LARGE MODULAR SCIENTIFIC LIBRARIES IN Ada Final Report
G. T. Symm (National Physical Lab., Teddington, England), B. A. Wichmann (National Physical Lab., Teddington, England), J. Kok, and D. T. Winter Mar. 1984 152 p refs Sponsored by European Communities Commission
(CWI-NM-N8401; B8469329) Avail: NTIS HC A08/MF A01

Solutions for the design and implementation of scientific subroutine libraries in Ada are suggested. Precision, basic mathematical functions, composite data types, information passing, error handling, working space organization, and real time environment are considered. Author (ESA)

N84-30793# Technische Hogeschool, Delft (Netherlands).
TWO ALGORITHMS FOR THE CONTACT PROBLEM IN ELASTOSTATICS, 1982
J. J. Kalker 1982 12 p refs
(PB83-147678) Avail: NTIS HC A02/MF A01 CSCL 09B

A fundamental algorithm is given on which are based two algorithms for the discretized elastostatic contact problem: one for the normal, frictionless contact problem, and one for the tangential, frictional contact problem. The validity of the fundamental algorithm and of the two contact versions are proved rigorously. For the fundamental algorithm and the normal contact problem it is proved that the algorithm terminates after a finite number of steps. For the frictional algorithm, also, very good convergence properties can be proved. GRA

N84-30794# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
BURROUGHS CORPORATION B1000 SYSTEM INTERACTIVE, BASIC RELEASE 11.0 Validation Summary Report
12 Jan. 1984 15 p
(PB84-180215; OIT/FSTC-83/321) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Burroughs Corporation, B1000 System Interactive, BASIC Release 11.0 running under the MCPII Release 11.0 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 BASIC Standard (X3.60-1978/FIPS PUB 68). The compiler was validated against the minimal BASIC level of FIPS PUB 68. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies within X3.60-1978 and a detailed listing of discrepancies together with the tests which failed. GRA

N84-30795# National Oceanic and Atmospheric Administration, Rockville, Md. National Ocean Service.
SELECTION OF A GENERAL PURPOSE LANGUAGE AND A REAL-TIME LANGUAGE SUITABLE FOR SHIPBOARD DATA SYSTEM 3
S. R. Barnum Jan. 1984 36 p refs
(PB84-180892; NOAA/TM/NOS/CGS-1; NOAA-S/T-84-114; NOAA-84040301) Avail: NTIS HC A03/MF A01 CSCL 09B

All major general-purpose languages and all major real-time languages were surveyed and filtered based on the requirements of Shipboard Data System 3. The languages which passed the filter were then evaluated in depth. At this time FORTRAN 77 is judged to be the best overall choice for general-purpose applications software. FORTRAN 77 with the real-time extensions (FORTRAN ISA 61.1) is judged to be the best choice for real-time applications software. When Ada becomes widely available, it will be the best choice for both the general applications language and the real-time language. GRA

N84-30796# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
DATA GENERAL CORPORATION ECLIPSE MV/8000, MP-BASIC REVISION 3.00 Validation Summary Report
12 Jan. 1984 18 p
(PB84-181361; OIT/FSTC-83/303) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Data General Corporation, MP-BASIC Rev. 3.00 running under the AOS/VS Rev. 3.06 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 BASIC Standard (X3.60-1978/FIPS PUB 68). The compiler was validated against the Minimal BASIC level of FIPS PUB 68. The VSR is made up of several sections showing all the disrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies within X3.60-1978 and a detailed listing of discrepancies together with the tests which failed. GRA

N84-30797# Office of Software Development, Falls Church, Va. Federal Software Testing Center.
UNITED INFORMATION SERVICES, INC. CDC CYBER 175, SUPER BASIC VERSION 1.0 Validation Summary Report
3 Feb. 1984 32 p
(PB84-181387; OIT/FSTC-83/284) Avail: NTIS HC A03/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the United Information Services, Inc., Super BASIC Version 1.0 running under the APEX 4.7.3 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 BASIC Standard (X3.60-1978/FIPS PUB 68). The compiler was validated against the Minimal BASIC level of FIPS PUB 68. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies within X3.60-1978 and a detailed listing of discrepancies together with the tests which failed. GRA

N84-30798# Federal Compiler Testing Center, Falls Church, Va. Federal Software Testing Center.
GOULD INCORPORATED, GOULD CONCEPT 32/87, COBOL RELEASE 1.4
24 Jan. 1984 54 p
(PB84-180249; OIT/FSTC-83/290) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Gould Incorporated COBOL Rel. 1.4 running under the MPX-32 Rev. 2, Rel. 2.1A provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the Low-Intermediate level of FIPS PUB 21.1. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-30799*# National Academy of Sciences - National Research Council, Washington, D. C. Commission on Engineering and Technical Systems.
REVIEW OF NASA'S (NATIONAL AERONAUTICS AND SPACE ADMINISTRATION) NUMERICAL AERODYNAMIC SIMULATION PROGRAM
Mar. 1984 49 p refs Sponsored in part by the Congressional Committees on Appropriations
(Contract NASw-3511)
(NASA-CR-173842; NAS 1.26:173842; PB84-194919) Avail: NTIS HC A03/MF A01 CSCL 09B

NASA has planned a supercomputer for computational fluid dynamics research since the mid-1970's. With the approval of the Numerical Aerodynamic Simulation Program as a FY 1984 new start, Congress requested an assessment of the program's objectives, projected short- and long-term uses, program design, computer architecture, user needs, and handling of proprietary and classified information. Specifically requested was an examination of the merits of proceeding with multiple high speed processor (HSP) systems contrasted with a single high speed processor system. The panel found NASA's objectives and projected uses sound and the projected distribution of users as realistic as possible at this stage. The multiple-HSP, whereby new, more powerful state-of-the-art HSP's would be integrated into a flexible network, was judged to present major advantages over any single HSP system. GRA

N84-30468*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE ERODYN AND QRPIG COMPUTER PROGRAMS
Theodore L. Felsentreger *In its* Res. Activities of the Geodyn. Branch Jun. 1984 3 p refs (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 09B

N84-30499# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
COMEDG: A PROGRAM TO COMBINE LOGICALLY INDEPENDENT LINE SEGMENTS INTO GEOMETRICALLY COHERENT LINES
Jiang Jing-tong (Academia Sinica, Chengdu, China) *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 35-54 (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30500# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AUTOMATION ASSISTED GATHERING, PROCESSING, AND REPRESENTATION OF TOPOGRAPHIC DATA FOR THE PRODUCTION OF THE GERMAN BASIC MAP 1:5000 - HEIGHT IN LOWER SAXONY [AUTOMATIONSGESTUETZTES ERFASSEN, VERARBEITEN UND DARSTELLEN TOPOGRAPHISCHER DATEN FUER DIE HERSTELLUNG DER DEUTSCHEN GRUNDKARTE 1:5000-HOEHE IN NIEDERSACHSEN]
Erwin Kophstahl *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 55-59 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30503# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
SOFTWARE RESEARCH FOR COMPUTER AIDED CARTOGRAPHY AT THE BERLIN TECHNICAL UNIVERSITY [SOFTWARE-ENTWICKLUNG ZUR RECHNERGESTUETZTEN KARTOGRAPHIE AN DER TECHNISCHE UNIVERSITAET BERLIN]
Alfred Mehlbreuer and Gerhard Koenig *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 83-93 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30504# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
AN EXAMPLE OF COMPUTER AIDED GENERALIZATION OF TK 25 [EIN BEISPIEL RECHNERGESTUETZTER GENERALISIERUNG FUER DIE TK 25]
Kurt Menke *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 95-108 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

N84-30506# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
A SYSTEM FOR AUTOMATIC DIGITIZATION OF CARTOGRAPHIC LINE DRAWINGS [EIN NEUES SYSTEM ZUR AUTOMATISCHEN DIGITALISIERUNG KARTOGRAPHISCHER STRICHZEICHNUNGEN]
Ivar Nackunstz *In its* Repts. on Cartography and Geodesy. Ser. 1: Original Repts., No. 92 1983 p 143-155 refs In GERMAN; ENGLISH summary (For primary document see N84-30495 20-42)
Avail: NTIS HC A09/MF A01

62 COMPUTER SYSTEMS

Includes computer networks.

N84-30800*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AUGMENTING COMPUTER NETWORKS Final Report
Shahid H. Bokhari and A. D. Raza Jul. 1984 26 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-172399; NAS 1.26:172399; ICASE-84-33) Avail: NTIS HC A03/MF A01 CSCL 09B

Three methods of augmenting computer networks by adding at most one link per processor are discussed: (1) A tree of N nodes may be augmented such that the resulting graph has diameter no greater than 4[log sub 2((N+2)/3)]-2. Thi O(N(3)) algorithm can be applied to any spanning tree of a connected graph to reduce the diameter of that graph to O(log N); (2) Given a binary tree T and a chain C of N nodes each, C may be augmented to produce C so that T is a subgraph of C. This algorithm is O(N) and may be used to produce augmented chains or rings that have diameter no greater than 2[log sub 2((N+2)/3)] and are planar; (3) Any rectangular two-dimensional 4 (8) nearest neighbor array of size N = 2(k) may be augmented so that it can emulate a single step shuffle-exchange network of size N/2 in 3(t) time steps. M.G.

N84-30801*# Michigan Univ., Ann Arbor. Dept. of Electrical Engineering and Computer Science.
CHARACTERIZATION OF REAL-TIME COMPUTERS Contractor Report, 1 Sep. 1982 - 31 Dec. 1983
Kang G. Shin and C. M. Krishna Washington NASA Aug. 1984 131 p refs
(Grant NAG1-296)
(NASA-CR-3807; NAS 1.26:3807) Avail: NTIS HC A07/MF A01 CSCL 09B

A real-time system consists of a computer controller and controlled processes. Despite the synergistic relationship between these two components, they have been traditionally designed and analyzed independently of and separately from each other; namely, computer controllers by computer scientists/engineers and controlled processes by control scientists. As a remedy for this problem, in this report real-time computers are characterized by performance measures based on computer controller response time that are: (1) congruent to the real-time applications, (2) able to offer an objective comparison of rival computer systems, and (3) experimentally measurable/determinable. These measures, unlike others, provide the real-time computer controller with a natural link to controlled processes. In order to demonstrate their utility and power, these measures are first determined for example controlled processes on the basis of control performance functionals. They are then used for two important real-time multiprocessor design applications - the number-power tradeoff and fault-masking and synchronization. B.W.

N84-30802# Integrated Systems, Inc., Palo Alto, Calif.
CANONICAL REALIZATIONS OF COMPLETELY REGULAR MODULAR COMPUTING NETWORKS
H. Lev-Ari May 1984 47 p
(Contract N00014-83-C-0377)
(AD-A142010; ISI-41) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper establishes a simple technique for transforming a given 3- dimensional space-time representation into an equivalent canonical form. A catalogue of canonical forms is constructed, showing a total of 34 distinct systolic architectures. The task of selecting an appropriate transformation for a given space-time representation reduces, therefore, to the determination of the equivalent canonical form. The important result, which has been overlooked in previous research, is that the canonical equivalent of any given space-time representation is unique. This means that once a space-time representation has been specified there is no flexibility left in the process of mapping into systolic-array architectures. A small fraction of space-time representation do allow some flexibility in selecting the hardware architecture, but only at the cost of inefficient implementation. The well-known example of matrix multiplication, which has four distinct realizations turns out to be one of the few cases where such flexibility is available. A closer examination of the structure of the matrices to be multiplied reveals that each realization is efficient under a different set of structural assumptions. Thus, in summary, carefully specified algorithms lead to unique space-time representations which, in turn, lead to essentially unique architectures. Author (GRA)

N84-30803# Argonne National Lab., Ill.
ARGONNE INTEGRATED HETEROGENEOUS FILE TRANSFER NETWORK
J. Schofield 1984 23 p refs Presented at 25th Assoc. for Energy Systems, Operations and Programming Conf., Seattle, 30 Apr. 1984
(Contract W-31-109-eng-38)
(DE84-012092; CONF-8404152-1) Avail: NTIS HC A02/MF A01

This presentation describes the computing environment at Argonne National Laboratory and the actions underway to implement a coherent hierarchy of computing systems connected through a heterogeneous file transfer network. A major goal of the Computing Services Division is to integrate heterogeneous computing elements incrementally into a network, with the goal of having everything somehow connected to everything else. Using standard IBM networking protocols, a full-function computer-to-computer file transfer network of IBM and DEC VAX systems has been built. Currently, the users on the IBM MVS and VM/CMS systems can use standard IBM commands to send files and mail to DEC VAX users and output devices, and they can receive files from the DEC VAX's as if they had been seen from other IBM systems; similarly, the DEC VAX users can use standard DEC commands to send files and mail to IBM users and output devices, and they can receive files from the IBM systems as if they had been sent from other DEC VAX systems. In fact, the VAXes can exchange files and mail among themselves via the IBM NJE-based network without the need for DECnet links between the VAXes. DOE

N84-30804# Los Alamos Scientific Lab., N. Mex. Computing and Communications Div.
CURRENT RESEARCH IN PARALLEL MICROPROCESSING SYSTEMS AT LOS ALAMOS
C. Dwayne Ethridge 1984 6 p Presented at 6th Ann. Ideas in Sci. and Eng. Exposition and Symp., Albuquerque, N. Mex., 2 May 1984 Submitted for publication
(Contract W-7405-eng-36)
(DE84-011342; LA-UR-84-1324; CONF-8405131-5) Avail: NTIS HC A02/MF A01

A parallel microprocessor system (PuPS) is under development to serve as a research tool for evaluating parallel processing of large scale scientific codes. PuPS is an experimental architecture consisting of an orthogonal array of 20 processing elements by 32 memory elements, establishing a tightly coupled, shared memory machine. The hardware incorporates VLSI components, such as 16-bit microprocessors, floating point coprocessors, and dynamic random access memories. The design replaces conventional MSI/SSI circuitry with programmable array logic, logic sequencers, and logic arrays. This experimental system will enable direct comparisons of speedups of algorithms for a variety of multiprocessor architectures. DOE

N84-30805# California Univ., Livermore. Lawrence Livermore Lab.
SYNTAX AND SEMANTICS OF A LINCS CONTROL MONOLOGUE
James A. Minton, James E. Donnelley, Donna T. Mecozzi, and Pierre J. DuBois 11 Apr. 1984 36 p refs
(Contract W-7405-eng-48)
(DE84-011399; UCID-18852-Rev-2) Avail: NTIS HC A03/MF A01

The basic unit of information in a LINCS Control Monologue is a token. A sequence of tokens makes up a statement, a sequence of statements makes up a message, and one or more messages and associated state information make up a control monologue. A monologue is bound to an association. An association is made up of a speaker and a listener, where each is represented as a LINCS port address. The data structure in which the state information retained is called a Control Monologue Record (CMR). The syntax and semantics of tokens, statements, messages, control monologues, and CMRs are defined. DOE

N84-30806# California Univ., Livermore. Lawrence Livermore Lab.
SERIAL LINK PROTOCOL DESIGN: A CRITIQUE OF THE X.25 STANDARD, LEVEL 2
John G. Fletcher 25 Oct. 1983 31 p refs Presented at the ACM SIGCOMM Symp. on Commun. Architectures and Protocols, Montreal, 6-8 Jun. 1984
(Contract W-7405-eng-48)
(DE84-002724; UCRL-83604-Rev-1; CONF-840636-Rev-1) Avail: NTIS HC A03/MF A01

There are certain technical design principles for link communication protocols which, if followed, result in a protocol that is less complex in both concept and implementation, but at the same time provides better service, than if the principles are not followed. These principles include modularization into subprotocols, symmetry between the nodes on the link, and use of the state-exchange model of a conversion rather than the command-response model. The principles are described, the extent to which they are followed by the standard protocol X.25, level 2, is examined, and a protocol adhering to them is presented. DOE

N84-30807# California Univ., Livermore. Lawrence Livermore Lab.
REPORT ON THE EXPERIENCE WITH THE SUPERVISORY CONTROL AND DIAGNOSTICS SYSTEM (SCDS) OF MFTF-B
Robert H. Wyman 18 Nov. 1983 7 p refs Presented at the 10th Symp. on Fusion Eng., Philadelphia, 5-9 Dec. 1983
(Contract W-7405-eng-48)
(DE84-012599; UCRL-89474; CONF-831203-145) Avail: NTIS HC A02/MF A01

The Supervisory Control and Diagnostics System (SCDS) of MFTF is a multiprocessor computer system using graphics oriented displays with touch sensitive panels as the primary operator interface. Late in the calendar year 1981 the system was used to control an integrated test of the vacuum vessel, vacuum system, cryogenics system and the superconducting magnet of MFTF. Since the completion of those tests and starting in early calendar 1983 the system has been used for control of the neutral beam test facility at LLNL. This paper presents a short overview of SCDS for the purpose of orientation and then proceeds to describe the difficulties uncountered in these preliminary encounters with reality. The band-aids used to hold things together as disaster threatened as well as the long term solutions to the problems will be discussed. Some comments are also presented on system costs and management philosophy. DOE

N84-30656# Joint Publications Research Service, Arlington, Va.
EXCHANGE OF GASES AND PHYSICAL WORK CAPACITY IN NATIVES OF DIFFERENT GEOGRAPHIC REGIONS
N. A. Agadzhanyan, A. I. Yelfimov, A. Ye. Severin, and I. A. Pas *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 3, May - Jun. 1984 (JPRS-USB-84-005) 3 Jul. 1984 p 91-95 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 3, May - Jun. 1984 p 65-68 (For primary document see N84-30642 20-51)
Avail: NTIS HC A07

N84-30755# Hughes Aircraft Co., Fullerton, Calif.
AN ADA (TRADEMARK) NETWORK: A REAL-TIME DISTRIBUTED COMPUTER SYSTEM
D. S. Lane, G. Huling, and B. M. Bardin *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 55-61 (For primary document see N84-30745 20-61)
(AD-P003423) Avail: NTIS HC A07/MF A01 CSCL 09/2

N84-30759# RCA Government Systems Div., Moorestown, N. J. Missile and Surface Radar.
MILITARY COMPUTER FAMILY OPERATING SYSTEM: AN Ada (TRADEMARK) APPLICATION
F. E. Wuebker *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 86-88 (For primary document see N84-30745 20-61)
(AD-P003427) Avail: NTIS HC A07/MF A01 CSCL 09/2

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N84-30808*# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
SOME DESIGN GUIDELINES AND DISCRETE-TIME ADAPTIVE CONTROLLERS
Charles E. Rohrs, Michael Athans, Lena Valavani, and Gunter Stein Jun. 1983 19 p refs Sponsored in part by NASA
(Grant NGL-22-009-124; Contract N00014-82-K-0582; Grants NSF ECS-82-10960; NSF ECS-82-06495)
(NASA-CR-173800; NAS 1.26:173800; AD-A133710; LIDS-P-1312) Avail: NTIS HC A02/MF A01 CSCL 14B

There have been many algorithms proposed for adaptive control which will provide globally asymptotically stable controllers if some stringent conditions on the plant are met. The conditions on the plant cannot be met in practice as all plants will contain high frequency unmolded dynamics therefore, blind implementation of the published algorithms can lead to disastrous results. This paper uses a linearization analysis of a non-linear adaptive controller to demonstrate analytically design guidelines which aleviate some of the problems associated with adaptive control in the presence of unmodeled dynamics. GRA

N84-30809# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
DESIGN ISSUES IN PARALLEL ARCHITECTURES FOR ARTIFICIAL INTELLIGENCE
C. Hewitt and H. Lieberman Nov. 1983 17 p
(Contract N00014-80-C-0505)
(AD-A142482; AI-M-750) Avail: NTIS HC A02/MF A01 CSCL 09/2

Development of highly intelligent computers requires a conceptual foundation that will overcome the limitations of the von Neumann architecture. Architectures for such a foundation should meet the following design goals: Address the fundamental organizational issues of large-scale parallelism and sharing in a fully integrated way. This means attention to organizational principles, as well as hardware and software. Serve as an experimental apparatus for testing large-scale artificial intelligence systems. Explore the feasibility of an architecture based on abstractions, which serve as natural computational primitives for parallel processing. Such abstractions should be logically independent of their software and hardware host implementations. In this paper we lay out some of the fundamental design issues in parallel architecture for Artificial Intelligence, delineate limitations of previous parallel architectures, and outline a new approach that we are pursuing. Author (GRA)

N84-30810# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
ARTIFICIAL INTELLIGENCE AND ROBOTICS
M. Brady Feb. 1984 46 p
(Contracts N00014-75-C-0643; N00014-80-C-0505)
(AD-A142488; AI-M-756) Avail: NTIS HC A03/MF A01 CSCL 06/4

Since Robotics is the field concerned with the connection of perception to action, Artificial Intelligence must have a central role in Robotics if the connection is to be intelligent. Artificial

Intelligence addresses the crucial questions of: what knowledge is required in any aspect of thinking; how that knowledge should be represented; and how that knowledge should be used. Robotics challenges AI by forcing it to deal with real objects in the real world. Techniques and representations developed for purely cognitive problems, often in toy domains, do not necessarily extend to meet the challenge. Robots combine mechanical effectors, sensors, and computers. AI has made significant contributions to each component. We review AI contributions to perception and object oriented reasoning. Object-oriented reasoning includes reasoning about space, path-planning, uncertainty, and compliance. We conclude with three examples that illustrate the kinds of reasoning or problem solving abilities we would like to endow robots with and that we believe are worthy goals of both Robotics and Artificial Intelligence, being within reach of both. Author (GRA)

N84-30811# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
SMOOTHED LOCAL SYMMETRIES AND THEIR IMPLEMENTATION
M. Brady and H. Asada Feb. 1984 45 p
(Contracts N00014-75-C-0643; N00014-80-C-0505)
(AD-A142489; AI-M-757) Avail: NTIS HC A03/MF A01 CSCL 06/4

We introduce a novel representation of two-dimensional shape that we call smoothed local symmetries (SLS). Smoothed local symmetries represent both the bounding contour of a shape fragment and the region that it occupies. In this paper we develop the main features of the SLS representation and describe an implemented algorithm that computes it. The performance of the algorithm is illustrated for a set of tools. We conclude by sketching a method for determining the articulation of a shape into subshapes. Author (GRA)

N84-30812# Wisconsin Univ., Madison. Dept. of Mathematics.
[CONTROL THEORY OF PARTIAL DIFFERENTIAL EQUATIONS] Final Report, 1 Nov. 1982 - 31 Oct. 1983
D. L. Russell May 1984 61 p
(Grant AF-AFOSR-0018-79)
(AD-A142636; AFOSR-84-0506TR) Avail: NTIS HC A04/MF A01 CSCL 12/1

Research during this period was carried out in the general area of control theory of partial differential equations and the operation of the Modelling, Information Processing and Control Facility at the University of Wisconsin was begun. The program involves three distinct phases, all of which are under some degree of development. There is the fundamental program of research on the control theory of distributed parameter systems and the related program of research on self-excited oscillations related to flutter phenomena, the specific research program aimed at the development and improvement of control and identification strategies in connection with wing flutter problems, and the new area of distributed parameter model development and calibration in connection with the MIPAC facility. Author (GRA)

N84-30813# Los Alamos Scientific Lab., N. Mex.
INTELLIGENT OPTICAL DESIGN PROGRAM
I. O. Bohachevsky, V. K. Viswanathan, and G. Woodfin 4 May 1984 15 p refs Presented at SPIE Tech. Symp., Arlington, Va., 29 Apr. 1984
(Contract W-7405-eng-36)
(DE84-010071; LA-UR-84-910; CONF-8404124-3) Avail: NTIS HC A02/MF A01

Described is a general approach to the development of computer programs capable of designing image-forming optical systems without human intervention and of improving their performance with repeated attempts. The approach utilizes two ideas: (1) interpretation of technical design as a mapping in the configuration space of technical characteristics, and (2) development of an intelligent routine that recognizes global optima. Examples of lens systems designed and used in the development of the general approach are presented, current status of the project is summarized, and plans for the future effects are indicated. DOE

N84-30814# Argonne National Lab., Ill. Mathematics and Computer Science Div.
DESIGN PHILOSOPHY FOR RELIABLE SYSTEMS, INCLUDING CONTROL
John R. Gabriel Apr. 1984 18 p refs
(Contract W-31-109-eng-38)
(DE84-012681; ANL-84-29) Avail: NTIS HC A02/MF A01

The next generation of plant control will include intelligent systems - computer systems having knowledge of the plant and being capable of intelligent behavior, even though only some control functions will need such expertise. This report develops a framework for a universe of discourse usable by such non-human experts. It is based on the idea that a design has many features of a contract and may be described as a contract between humans and a machine, defining what each must do to attain a goal. Several points are discussed: the use of techniques in analytical redundancy and their place as analogues in administrative control for conventional techniques in physical control; the use of redundant computer systems to protect against hardware faults; the necessity to prove properties of software used in redundant hardware, because software faults are common modes across redundant hardware; and some issues in choosing a programming language for provable control software. This report concludes that the degree of reliability needed by the plant model used in analytic redundancy protection need not be nearly as reliable as the mechanism to detect discrepancy between plant and model. DOE

N84-30815# Oak Ridge National Lab., Tenn.
AUTOMATED PLANNING FOR INTELLIGENT MACHINES IN ENERGY-RELATED APPLICATIONS
C. R. Weisbin, G. deSaussure, and J. Barhen 1984 10 p refs Presented at the Intelligent Systems and Mach. Conf., Rochester, N.Y., 24-25 Apr. 1984
(Contract DE-AC05-84OR-21400)
(DE84-011666; CONF-8404158-1) Avail: NTIS HC A02/MF A01

This paper discusses the current activities of the Center for Engineering Systems Advanced Research (CESAR) program related to plan generation and execution by an intelligent machine. The system architecture for the CESAR mobile robot (named HERMIES-1) is described. The minimal cut-set approach is developed to reduce the tree search time of conventional backward chaining planning techniques. Finally, a real-time concept of an Intelligent Machine Operating System is presented in which planning and reasoning is embedded in a system for resource allocation and process management. DOE

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N84-30816*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPECTRAL METHODS FOR COMPRESSIBLE FLOW PROBLEMS Final Report
David Gottlieb Jun. 1984 22 p refs
(Contract NAS1-17070)
(NASA-CR-172395; NAS 1.26:172395; ICASE-84-29) Avail: NTIS HC A02/MF A01 CSCL 12A

Recent results concerning numerical simulation of shock waves using spectral methods are reviewed. Shock fitting techniques were discussed as well as shock capturing techniques with finite difference artificial viscosity. Also the notion of the information contained in the numerical results obtained by spectral methods and show how this information is recovered was discussed. Author

N84-30817*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SINGULAR VALUE DECOMPOSITION WITH SYSTOLIC ARRAYS Final Report
Ilse C. F. Ipsen Jul. 1984 25 p refs

(Contract NAS1-17070)
(NASA-CR-172396; NAS 1.26:172396; ICASE-84-30) Avail: NTIS HC A02/MF A01 CSCL 12A

Systolic arrays for determining the singular value decomposition of a mxn, m > n, matrix A of bandwidth w are presented. After A has been reduced to bidiagonal form B by means of Givens plane rotations, the singular values of B are computed by the Golub-Reinsch iteration. The products of plane rotations form the matrices of left and right singular vectors. Assuming each processor can compute or supply a plane rotation, O(wn) processors accomplish the reduction to bidiagonal form in O(np) steps, where p is the number of superdiagonals. A constant number of processors then determines each singular value in about 6n steps. The singular vectors are computed by rerouting the rotations through the arrays used for the reduction to bidiagonal form, or else along the way by employing another rectangular array of O(wm) processors.
Author

N84-30818*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LEGENDRE-TAU APPROXIMATION FOR FUNCTIONAL DIFFERENTIAL EQUATIONS. PART 2: THE LINEAR QUADRATIC OPTIMAL CONTROL PROBLEM Final Report
Kazufumi Ito and Russell Teglas Jul. 1984 67 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-172397; NAS 1.26:172397; ICASE-84-31) Avail: NTIS HC A04/MF A01 CSCL 12A

The numerical scheme based on the Legendre-tau approximation is proposed to approximate the feedback solution to the linear quadratic optimal control problem for hereditary differential systems. The convergence property is established using Trotter ideas. The method yields very good approximations at low orders and provides an approximation technique for computing closed-loop eigenvalues of the feedback system. A comparison with existing methods (based on averaging and spline approximations) is made. Author

N84-30819# Oakland Univ., Rochester, Mich. Dept. of Chemistry.
A TAYLOR SERIES IN SYMMETRY-ADAPTABLE FUNCTIONS
J. M. McKinley and P. P. Schmidt Oct. 1983 12 p
(Contract N00014-77-C-0293)
(AD-A142336; TR-14) Avail: NTIS HC A02/MF A01 CSCL 12/1

We present a Taylor series in spherical polar coordinates for a general class of functions which separate into purely angular and purely radial parts. The series depends upon the spherical harmonic functions, and, therefore, is symmetry-adaptable. The general expression for the series is developed and some specific examples are considered. In particular, we note that the Taylor series coincides with the Laplace expansion for the Coulomb potential. When the display the particular series for the exponential, exp(-ar), and the inverse power law, r to the minus q power. GRA

N84-30820# North Carolina State Univ., Raleigh. Dept. of Mathematics.
[STUDY OF NONLINEAR SINGULAR SYSTEMS] Final Report, 1 Jan. 1981 - 30 Apr. 1984
S. L. Campbell 30 Apr. 1984 21 p
(Grant AF-AFOSR-0052-81)
(AD-A142348; AFOSR-84-0451TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The numerical and analytic solution of nonlinear singular systems of the form Ax' + B(x) = f are studied. Numerical and analytic procedures are developed for several cases of interest. These results are applied to the analysis of semi-state circuit models, cheap control problems, and constrained path control problems.
Author (GRA)

N84-30821# Illinois Univ., Urbana. Decision and Control Lab.
ANALYSIS AND CONTROL OF A CLASS OF STIFF LINEAR DISTRIBUTED SYSTEMS Ph.D. Thesis
H. Salhi Jul. 1983 186 p
(Contract N00014-79-C-0424)
(AD-A142364; DC-61; UILU-ENG-83-2209) Avail: NTIS HC A09/MF A01 CSCL 12/1

This thesis examines a class of systems whose models are described by linear partial differential equations that depend on a small parameter epsilon. First, the spectral decomposition of the so-called stiff operators (using the terminology of 24) is investigated, including the convergence of clarifying their eigenvalue eigenvector pairs as epsilon approaches 0, with the objective of clarifying their singular behavior. Second, asymptotic approximation of the solution boundary value problems involving stiff operators are constructed, using the weak limits of their eigenvectors. This approach leads to a decomposition into regular approximation and internal layer approximation, which are found separately and then combined to provide an approximation to the original problem. This methodology is not complicated. Moreover, it alleviates the inherent stiffness when numerical algorithms are employed. Third, the same approach is applied to some control problems. In this case, similar results are obtained, provided additional requirements are satisfied; due to the type of control, which may drastically alter the system behavior. Author (GRA)

N84-30822# Illinois Univ., Urbana. Decision and Control Lab.
A NUMERICAL ALGORITHM FOR CHAINED AGGREGATION AND MODIFIED CHAINED AGGREGATION
H. S. Tharp Sep. 1983 129 p
(Contract N00014-79-C-0424; Grant NSF ECS-82-17631)
(AD-A142394; DC-62; UILU-ENG-83-2217; R-996) Avail: NTIS HC A07/MF A01 CSCL 12/1

A computer implementation of chained aggregation and modified chained aggregation using orthogonal transformations is presented. The numerical advantages associated with orthogonal matrices are highlighted. The developed algorithm is then employed to identify a reduced-order model of a large space structure. With the reduced-order model, an output feedback design is carried out. The design is shown to produce an acceptable result on the full order model. Author (GRA)

N84-30823# Oregon State Univ., Corvallis. Dept. of Electrical and Computer Engineering.
HIERARCHIAL COMMAND, CONTROL AND COUPLED BILINEAR SYSTEMS
R. R. Mohler, W. J. Kolodziej, and F. J. Bugnon 1984 7 p
(Contract N00014-81-K-0814)
(AD-A142401; OSU-ONR-TR-84-5) Avail: NTIS HC A02/MF A01 CSCL 12/1

Models of a coupled bilinear structure are studied here. Included are applications to immunology and generalized defense processes. In some cases, coupled bilinear systems arise naturally and in others they represent valid approximations to more highly nonlinear systems. A basis is developed for multi-level command and control. Finally, hierarchical pursuit-evasion strategies are introduced, and plans are presented for more detailed studies. Author (GRA)

N84-30824# Illinois Univ., Urbana. Applied Computation Theory Group.
NEW ALGORITHMS FOR NEAR NEIGHBOR SEARCHING
B. Chazelle and F. P. Preparata Sep. 1983 23 p
(Contract N00014-79-C-0424)
(AD-A142404; ACT-40; UILU-ENG-83-2218; R-997) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper proposes a new technique for solving near neighbor problems in the plane. We illustrate our method on the following two problems: (1) k-Nearest neighbor; Given a set S of n points in the plane and a query of the form (q,k), with a q a query point and k a positive integer, report the k points of S closest to q, (2) Circular Range Search: Given a set S of n points in the plane and a query of the form (q,d), with q a query point and d a positive real number, report all the points of S that lie inside the circle of radius d, centered at q. Our main results include 0(n to the 1 plus epsilon power) space, 0(k + log n) query time algorithms for solving each of these problems; k denotes the size of the output. We also show that it is possible to solve either problem in 0(k log squared n) query time, using only 0(n log n) space. These results constitute significant improvements over previous methods, in particular regarding the circular range search problem, which had previously defied efficient solutions. Author (GRA)

N84-30825# Illinois Univ., Urbana. Applied Computation Theory Group.
THE COMPLEXITY OF SORTING ON DISTRIBUTED SYSTEMS
M. C. Loui Sep. 1983 28 p
(Contract N00014-79-C-0424; Grant NSF MCS-82-17445)
(AD-A142415; ACT-39; UILU-ENG-83-2216) Avail: NTIS HC A03/MF A01 CSCL 09/2

The sorting problem is no arrange N values in a distributed system of N processors into sorted order. Let the values be in (0,...,L). Every sorting algorithm requires omega (N 2 lg(L/N)/lg N) messages on a bidirectional ring with N processors. Every sorting algorithm requires omega (N 3/2 lg(L/N)/lg N) messages on a square mesh with N processors. A novel sorting algorithm for unidirectional rings achieves the first lower bound. Author (GRA)

N84-30826# Oregon State Univ., Corvallis. Dept. of Electrical and Computer Engineering.
STATE ESTIMATION AND CONTROL OF CONDITIONALLY LINEAR SYSTEMS
W. J. Kolodziej and R. R. Mohler Apr. 1984 26 p
(Contract N00014-81-K-0814)
(AD-A142455; OSU-ONR-TR-84-3) Avail: NTIS HC A03/MF A01 CSCL 12/1

The filtering problem for a partially observable stochastic system, with linear in observable states dynamics and non-Gaussian initial conditions is studied here. It is shown that the conditional expected value of the unobservable states, given the past observations, can be expressed in terms of a finite dimensional set of statistics. This result, which generalizes the conditionally Gaussian filter is used to derive a separation principle for a linear-quadratic control problem. Author (GRA)

N84-30827# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
THE CURVATURE PRIMAL SKETCH Memorandum Report
H. Asada and M. Brady Feb. 1984 23 p
(Contracts N00014-75-C-0643; N00014-80-C-0505)
(AD-A142460; AI-M-758) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper we introduce a novel representation of the significant changes in curvature along the bounding contour of planar shape. We call the representation the curvature primal sketch. We describe an implemented algorithm that computes the curvature primal sketch and illustrate its performance on a set of tool shapes. The curvature primal sketch derives its name from the close analogy to the primal sketch representation advocated by Marr for describing significant intensity changes. We define a set of primitive parameterized curvature discontinuities, and derive expressions for their convolutions with the first and second derivatives of a Gaussian. The convolved primitives, sorted according to the scale at which they are detected, provide us with a multi-scaled interpretation of the contour of a shape. Author (GRA)

N84-30828# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
ON THE EXTREMUM OF BILINEAR FUNCTIONAL FOR HYPERBOLIC TYPE PARTIAL DIFFERENTIAL EQUATIONS Final Report
C. N. Shen Apr. 1984 39 p Presented at the 1st Army Conf., Appl. Math. and Computing, Washington, D.C., 9-11 May 1983
(AD-A142505; AD-E440240; ARLCB-TR-84008) Avail: NTIS HC A03/MF A01 CSCL 12/1

Transient solutions of the hyperbolic type partial differential equations are needed for solving many engineering problems such as computing stress waves for gun dynamics or determining shock behaviors of penetration mechanics. Variational procedures using the bilinear formulations with adjoint variables can serve as the theoretical basis in the derivation of algorithms for the finite element methods, giving direct numerical solutions for partial derivatives of the functions to be found for these problems. The adjoint system can be arranged in a manner that it is a reflected mirror of the original system in time. Generalized boundary conditions employ many types of springs relating the various spatial partial derivatives. They are defined to satisfy the boundaries of the concomitant for the bilinear expression. Algorithms for use in the finite element method are simplified since the adjoint system gives exactly the same solutions as that of the original system. The second necessary condition for an extremum is satisfied by showing that the second variation is positive semi-definite. GRA

N84-30829# Naval Postgraduate School, Monterey, Calif.
A RETRIEVABLE RECIPE FOR INVERSE t Technical Report
D. P. Gaver and K. Kafadar May 1984 22 p
(RR0-1405)
(AD-A142557; NPS55-84-011) Avail: NTIS HC A02/MF A01 CSCL 12/1

A simple formula is first presented for the student t percent points that has the virtue of being easily re-derived from scratch: it is retrievable. It is also quite accurate, but improvements are also presented, as is a stand-alone formula (no normal tables need be applied). Author (GRA)

N84-30830# Pittsburgh Univ., Pa. Inst. for Computational Mathematics and Applications.
ON THE DESIGN OF A PIPELINED/SYSTOLIC FINITE ELEMENT SYSTEM
R. G. Melhem May 1984 28 p
(Contract N00014-80-C-0455)
(AD-A142558; ICMA-84-71) Avail: NTIS HC A03/MF A01 CSCL 12/1

A parallel finite element system is suggested based on the idea of pipelining the computations corresponding to the different finite elements. The systolic architecture is used extensively in the design to satisfy a regular and smooth flow of data in the pipe. Also a node numbering algorithm is developed in order to allow for the application of a frontal technique in the solution of the linear system of equations resulting from the analysis. Author (GRA)

N84-30831# Georgia Inst. of Tech., Atlanta. School of Mathematics.
[SPECTRAL AND INVERTIBILITY PROPERTIES OF BAND MATRICES] Final Scientific Report, 1 Sep. 1982 - 30 Sep. 1983
S. G. Demko May 1984 4 p
(Grant AF-AFOSR-0329-82)
(AD-A142637; AFOSR-84-0508TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Research supported under this effort investigated some of the spectral and invertibility properties of band matrices. Spectral theory and classical approximation theory were used to give a new proof of the exponential decay of the entries of the inverses of band matrices. The problem of obtaining spectral information about a given matrix from its submatrices was studied. Another result obtained during the research effort was that for subspaces of the continuous functions on the unit interval that have B-spline like bases there is an interpolating projection whose noun depends only on the condition number of the basis. Author (GRA)

N84-30832# California Univ., Los Angeles. School of Engineering and Applied Science.
STABILIZATION STUDIES Final Technical Report, 1 Feb. 1983 - 31 Jan. 1984
N. Levan Mar. 1984 9 p
(Grant AF-AFOSR-0053-79)
(AD-A142644; AFOSR-84-0504TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

During this period four papers were written including the titles, stabilization of infinite dimensional systems and the steady state Riccati equation, stability of an exponentially stabilize system, and strong stability of quasi-affine transforms of contraction semigroups. Further information on these papers and the research topics involved are contained in this report. Author (GRA)

N84-30833# Yale Univ., New Haven, Conn. Dept. of Computer Science.
TECHNIQUES FOR LARGE SPARSE SYSTEMS ARISING FROM CONTINUATION METHODS
Tony F. Chan Dec. 1983 16 p refs
(Contract DE-AC02-81ER-10996)
(DE84-010410; YALEU/DCS/TR-297) Avail: NTIS HC A02/MF A01

Numerical techniques are surveyed for solving the nonlinear and linear systems arising from applying continuation methods to tracing solution manifolds of parameterized nonlinear systems of the form G(u,lambda) = 0. Large and sparse problems are focused on, e.g. discretizations of partial differential equations, for which this part of the computation dominates the overall cost. The basic issue is a tradeoff of the exploitation of the sparsity structure of the Jacobian G/sub u/ and the numerical treatment of its singularity. Among the techniques to be discussed are: Newton and quasi-Newton methods, low rank correction methods, implicit deflation techniques, Krylov subspace iterative methods and multi-grid methods. DOE

N84-30834# Sandia Labs., Albuquerque, N. Mex.
GRAPH 2: A DIGITIZING AND GRAPH PLOTTING PROGRAM
C. B. Selleck Mar. 1984 51 p refs
(Contract DE-AC04-76DP-00789)
(DE84-010747; SAND-84-0302) Avail: NTIS HC A04/MF A01

GRAPH is an interactive program that allows the user to achieve two objectives. The first, is digitizing graphs or plots to create data files of points. The second, is the inverse of the first: plotting graphs from data files onto a graphics device. The program has extensive internal help and is designed to allow the user to get results quickly and easily. It is written in RATFOR and is intended for use on a VAX computer. The program provides grapical output through all of the Sandia Virtual Device Interface (VDI) graphics devices. DOE

N84-30835# California Univ., Livermore. Lawrence Livermore Lab.
LINEAR SYSTEMS ANALYSIS PROGRAM: PROGRAMMER'S MANUAL, VERSION 2.2 (VAX/VMS)
Diane M. Tilly 20 Apr. 1984 24 p
(Contract W-7405-eng-48)
(DE84-010953; UCID-30183-Rev-1) Avail: NTIS HC A02/MF A01

The computer program Linear Systems Analysis Program (LSAP) is an interactive program with graphics capability that can be used for the analysis and design of linear control systems. Nearly all classical design tools are available, including manipulation of transfer functions and generation of root locus, time response, and frequency response plots. This manual discusses the structure of the program. Included are explanations of implementation details of the underlying data structure. DOE

N84-30836# Los Alamos Scientific Lab., N. Mex.
HAMILTONIAN STRUCTURE OF FIELD-LINE EQUATIONS
Paul J. Channell Mar. 1984 7 p
(Contract W-7405-eng-36)
(DE84-011019; LA-10048-MS) Avail: NTIS HC A02/MF A01

The canonical structure of the field-line equations in toroidal geometry is derived, and the global Hamiltonian for one choice of canonical coordinates is given explicitly. DOE

N84-30837# Los Alamos Scientific Lab., N. Mex.
AN IMPROVED ACCURACY GENERAL REMAPPING ALGORITHM
John K. Dukowicz 1984 11 p refs Presented at the 9th Intern. Conf. on Numerical Methods in Fluid Dyn., Saclay, France, 25-29 Jun. 1984
(Contract W-7405-eng-36)
(DE84-004320; LA-UR-83-3549; CONF-840650-1) Avail: NTIS HC A02/MF A01

Most numerical methods in fluid dynamics can be classified as being either Lagrangian or Eulerian. An important group of methods, however, is a combination of both. These methods generally derive from the ALE (Arbitrary-Lagrangian-Eulerian) method of Hirt et al. A computational cycle in these methods is divided into two main phases: a Lagrangian phase and a rezone or remap phase (these two terms are used interchangeably). The remapping phase conservatively transfers quantities, calculated in the Lagrangian phase, from the Lagrangian mesh to some other specified mesh. For example, in a given time step the remap phase may be omitted, in which case the computation is purely Lagrangian, or the remapping may be back to the original mesh, in which case the computation is Eulerian. The remapping step, therefore, corresponds to the effect of the advection terms in Eulerian equations. It may also be viewed as a conservative interpolation procedure from one mesh to another, and so it is also useful in other more general applications, such as in adaptive mesh computations. In this paper a new method is extended to the case of a more accurate density distribution: the density distribution within a cell is allowed to be linear, while preserving the average value of density over the cell. DOE

N84-30838# Virginia Polytechnic Inst. and State Univ., Blacksburg.
APPLIED MATHEMATICS OF TRANSPORT THEORY Summary Progress Report
William Greenberg and Paul F. Zweifel Mar. 1984 13 p refs
(Contract DE-AS05-80ER-10711)
(DE84-011498; DOE/ER-10711/3) Avail: NTIS HC A02/MF A01

A brief summary is given of research in the areas of: abstract transport theory; reacting flow systems, homogenization of transport problems, and iterative calculations; gas dynamics; and problems in statistical mechanics, plasma stability, and mathematical transport theory. DOE

N84-30839# Texas Univ., Austin. Center for Particle Theory.
SPINORIAL RELATIVISTIC ROTATOR: THE TRANSFORMATION FROM QUASI-NEWTONIAN TO MINOKOWSKI COORDINATES
L. C. Biedenharn, A. Bohm, M. Tarlini, H. vanDam, and N. Mukunda Dec. 1983 38 p refs
(Contract DE-AS05-76ER-03992)
(DE84-009091; DOE/ER-03992/539) Avail: NTIS HC A03/MF A01

There exists a remarkably close relationship between the operator algebra of the Dirac equation and the corresponding operators of the spinorial relativistic rotator (an indecomposable object lying on a mass-spin Regge trajectory). The analog of the Foldy-Wouthuysen transformation (more generally, the transformation between quasi-Newtonian and Minkowski coordinates) is constructed and explicit results are discussed for the spin and position operators. Zitterbewegung is shown to exist for a system having only positive energies. DOE

N84-30840# Science Applications, Inc., Pleasanton, Calif.
MOVING FINITE ELEMENTS IN 2-D. TECHNICAL REPORT: YEAR 3 Technical Progress Report
R. J. Gelinas 3 Apr. 1984 39 p refs
(Contract DE-AC03-81ER-10858)
(DE84-008551; SAI-84-1572) Avail: NTIS HC A03/MF A01

The moving finite element (MFE) method has emerged as a potentially potent and interesting method for solving partial differential equations (PDE's) with large gradients. The principal feature of the MFE method is that the grid node coordinates, themselves, are dependent variables and are calculated at each time step so as to minimize a PDE residual in some norm. This has the effect of moving the grid nodes continuously and systematically to those positions which minimize PDE numerical solution errors. The progress of 2-D MFE research is reported. DOE

N84-30841# GA Technologies, Inc., San Diego, Calif.
REDUCED EQUATIONS IN THREE DIMENSIONAL GEOMETRY
M. S. Chu, T. H. Jensen, and J. S. Kim Mar. 1984 11 p refs
Presented at US/Japan Workshop on 3-D MHD Studies, Oak Ridge, Tenn., 19 Mar. 1984
(Contract DE-AT03-84ER-53158)
(DE84-009401; GA-A-17510; CONF-840370-1) Avail: NTIS HC A02/MF A01

The nature of the resistive MHD equations is examined in terms of a set of gauge functions based on the magnetic field. A set of reduced equations may be arrived at in this gauge by making the simple assumption that the compressional motion is decoupled from the shear motion. The equations reduce to those first proposed by Strauss and by Chance et al., when the perpendicular perturbation wavelength is much shorter than the equilibrium length scale. DOE

N84-30842# Sandia Labs., Albuquerque, N. Mex.
BOOLEAN COMPUTATION OF OPTIMUM HITTING SETS
Bernie L. Hulme, Lorraine S. Baca, Ann W. Shiver, and Richard B. Worrell Apr. 1984 13 p refs
(Contract DE-AC04-76DP-00789)
(DE84-012920; SAND-84-0448) Avail: NTIS HC A02/MF A01

This report presents the results of computational experience in solving weighted hitting set problems by Boolean algebraic methods. The feasible solutions are obtained by Boolean formula manipulations, and the optimum solutions are obtained by comparing the weight sums of the feasible solutions. Both the algebra and the optimization can be accomplished using the SETS language. One application is to physical protection problems. DOE

N84-30843# Rome Univ. (Italy). Inst. of Physics.
SUPERSYMMETRIC NONLINEAR SIGMA MODELS CONSTRAINED ON A NONCOMPACT MANIFOLD
Nobuyoshi Ohta 29 Jun. 1983 45 p refs Submitted for publication
(Preprint-356) Avail: NTIS HC A03/MF A01

Analysis by 1/n expansion of supersymmetric nonlinear sigma models in two dimensions with U(n) symmetry in which the scalar fields are constrained on a noncompact manifold is presented. The theories are ultraviolet finite. In the massless version of the models no mass scale is generated and gauge bosons fail to get dynamics while this is possible provided the theory contains a mass scale. The effects of introduction of the theta-term into supersymmetric theories are discussed. It is argued that supersymmetry is broken by the term only in finite supersymmetric theories. A singular behavior in the massless limit in these models is pointed out. Author (ESA)

N84-30844# Sheffield Univ. (England). Dept. of Control Engineering.
INPUT-OUTPUT PARAMETRIC MODELS FOR NONLINEAR SYSTEMS. PART 1: DETERMINISTIC NONLINEAR SYSTEMS
I. J. Leontaritis and S. A. Billings Apr. 1984 43 p refs 2 Vol.
(Grant SERC-GR/B/31163)
(RR-251-Pt-1) Avail: NTIS HC A03/MF A01

Recursive input-output models for nonlinear multivariable discrete-time systems are derived and sufficient conditions for their existence are defined. Nerode realization, multistructural forms and results from differential geometry used to derive a recursive input-output model for multivariable deterministic nonlinear systems are introduced. Author (ESA)

N84-30845# Sheffield Univ. (England). Dept. of Control Engineering.
INPUT-OUTPUT PARAMETRIC MODELS FOR NONLINEAR SYSTEMS. PART 2: STOCHASTIC NONLINEAR SYSTEMS
I. J. Leontaritis and S. A. Billings Apr. 1984 23 p refs 2 Vol.
(Contract SERC-GR/B/31163)
(RR-252-Pt-2) Avail: NTIS HC A02/MF A01

A recursive input-output model for deterministic nonlinear multivariable discrete-time systems is compared with other system representations. Results are extended to create prediction error input-output models for multivariable nonlinear stochastic systems. These latter models are a generalization of the ARMAX models for linear systems and are referred to as NARMAX or Nonlinear Auto Regressive Moving Average models with eXogenous inputs. Author (ESA)

N84-30846# Bielefeld Univ. (West Germany). Zentrum fuer Interdisziplinaere Forschung.
A VARIATIONAL FORMULATION FOR DISSIPATIVE MAPS
R. Vilela Mendes (Instituto Nacional de Investigacao Cientifica, Lisbon) May 1984 12 p refs
(Rept-81) Avail: NTIS HC A02/MF A01

For arbitrary differentiable maps, functionals are constructed which are stationary if (or if and only if) the variables are map orbits. The nature of the stationary points and the relation of the Hessian eigenvalue distribution to periodicity of the orbits are studied. Author (ESA)

N84-30117*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ELLIPTIC GRID GENERATION FOR THREE-DIMENSIONAL GEOMETRIES
Kozo Fujii *In* Inst. of Space and Astronautical Science Proc. of the Symp. on Mech. for Space Flight Mar. 1984 p 23-28 refs
(For primary document see N84-30114 20-31)
Avail: NTIS HC A06/MF A01 CSCL 12A

N84-30761# Youngstown State Univ., Ohio. Dept. of Mathematical and Computer Sciences.
Ada (TRADEMARK) TASKING IN NUMERICAL ANALYSIS
J. J. Buoni *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 104-108 (For primary document see N84-30745 20-61)
(AD-P003429) Avail: NTIS HC A07/MF A01 CSCL 12/1

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N84-30847# Arms Control and Disarmament Agency, Washington, D. C. Field Operations Div.
THEORY AND APPLICATIONS OF RANDOM FIELDS Final Report, 1 Jan. - 31 Dec. 1983
R. J. Adler 6 Feb. 1984 16 p
(Grant AF-AFOSR-0068-83)
(AD-A142346; AFOSR-84-0458TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The main results discussed in this final report include: (1) A discussion of the sample path behavior of chi-squared stochastic processes, with emphasis on the ways in which such processes exhibit non-normal behavior. (2) A discussion of the existence and path continuity of set indexed processes with independent increments. (3) Information on the distribution of suprema of random fields and empirical processes, with applications to stochastic modeling and statistical hypothesis testing. Author (GRA)

N84-30848# Stanford Univ., Calif. Dept. of Statistics.
ASYMMETRIC WEINER-POISSON CONTROL
H. Weiner 24 May 1984 17 p
(Contract N00014-76-C-0475)
(AD-A142452; SU-TR-344) Avail: NTIS HC A02/MF A01 CSCL 12/1

A one-dimensional Wiener plus independent Poisson control problem with asymmetric constant bounds on the control and integral discounted quadratic cost function is considered. The resultant Bellman equation is solved when two homogeneous partial differential-difference equations are solvable and when the Bellman function satisfies certain matching and boundary conditions. These sufficient conditions would allow the optimal control to be expressed in bang-bang form. Author (GRA)

N84-30849# Illinois Univ., Urbana-Champaign. Coordinated Science Lab.
ON FIXED-INTERVAL MINIMUM SYMBOL ERROR PROBABILITY DETECTION
S. Verdu Jun. 1983 11 p
(Contract DAAG29-81-K-0062)
(AD-A142465; R-990; UILU-ENG-83-2211) Avail: NTIS HC A02/MF A01 CSCL 12/1

A channel that introduces intersymbol interference and white Gaussian noise is shared by K asynchronous users that modulate linearly a set of preassigned signal waveforms. In this report an algorithm that implements symbol-by-symbol detection upon observation of an entire data record is derived. The algorithm involves nonlinear operations and the forward and backward processing of the data with linear complexity in the length of the observation record. The computational requirements of the prepared scheme are compared favorably with a single user Viterbi-like minimum BER algorithm recently proposed by Hayes et al. Author (GRA)

N84-30850# Stanford Univ., Calif. Dept. of Statistics.
APPLICATIONS OF COMBINATORICS TO THE BUSY PERIOD IN SEVERAL QUEUEING MODELS
S. G. Mohanty and J. L. Jain 5 Jun. 1984 30 p
(Contract N00014-76-C-0475)
(AD-A142492; TR-345) Avail: NTIS HC A03/MF A01 CSCL 12/1

Combinatorial methods are used to derive the distribution of the busy period in a Markovian tandem queue and queues with finite capacity in five models each involving batches. Author (GRA)

N84-30851# Applied Research Lab., State College, Pa.
MODIFIED 5-POINT AND 9-POINT SCHEMES FOR THE SOLUTION OF THE VORTICITY- TRANSPORT EQUATION WITH CROSS DERIVATIVES
S. Abdallah 6 Feb. 1984 16 p
(Contract N00024-79-C-6043)
(AD-A142720; AD-F630334; ARL/PSU/TM-84-28) Avail: NTIS HC A02/MF A01 CSCL 12/1

The finite difference theory was modified to include cross derivatives in the vorticity-transport equation. Two modified versions of the five-point and nine-point schemes were derived for elliptic and parabolic partial differential equations. R.S.F.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N84-30852# Sheffield Univ. (England). Dept. of Control Engineering.
LINEAR STRUCTURES IN BILINEAR SYSTEMS
D. H. Owens and P. E. Crouch (Warwick Univ., England) Apr. 1984 10 p refs
(RR-250) Avail: NTIS HC A02/MF A01

It is demonstrated that a number of systems theoretical problems for a class of homogeneous bilinear systems in R sup n can be resolved by investigating simple properties of an induced linear system and can be checked by linear simulation techniques in R sup n-1 or pole-zero analysis of a related transfer function. The results use a mix of asymptotic analysis and functional analysis reminiscent of root-locus theory and suggest that more complex problems may be resolved by similar techniques. It may be possible to extend the cone containment results and to extend the transfer function analysis to the multi-input case. Author (ESA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

No abstracts in this category.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N84-30853# Los Alamos Scientific Lab., N. Mex.
MHD EQUILIBRIUM AND STABILITY OF ROTATING FRCs WITH EXCLUDED MULTIPOLE FIELDS
Ross L. Spencer 1984 5 p refs Presented at the 6th US-Japan Symp. on Compact Toroids, Princeton, N.J., 20-23 Feb. 1984
(Contract W-7405-eng-36)
(DE84-007477; LA-UR-84-633; CONF-840255-9) Avail: NTIS HC A02/MF A01

The multipole stabilization of the rotational mode in FRCs was studied previously in a simple circular geometry where it was found that quadrupole fields essentially do not stabilize the n = 2 rotational mode because of mode coupling. It is shown that there are two classes of FRC equilibria with excluded multipole fields: quasi-circular equilibria and cusp equilibria. Simple dynamical considerations as well as results from simulations and experiments show that cusp-like equilibria should be obtained in most if not all experiments. A careful examination of the stability calculation in the circular approximation shows that the mode-coupling problem in the case of quadrupole fields is very delicate and depends crucially on equilibrium details. Hybrid simulations show that quadrupoles do, in fact, stabilize the n = 2 mode. DOE

N84-30854# Los Alamos Scientific Lab., N. Mex.
INTERNAL MAGNETIC FIELD MEASUREMENTS IN A TRANSLATING FIELD-REVERSED CONFIGURATION
W. T. Armstrong, R. E. Chrien, K. F. McKenna, D. J. Ref, E. G. Sherwood, R. E. Siemon, and M. Tuszewski Feb. 1984 5 p refs Presented at the 6th US Symp. on Compact Toroid Res., Princeton, N.J., 20-23 Feb. 1984
(Contract W-7405-eng-36)
(DE84-010054; LA-UR-84-870; CONF-840255-19) Avail: NTIS HC A02/MF A01

Magnetic field probes have been employed to study the internal field structure of Field-Reversed Configurations (FRCs) translating past the probes in the FRX-C/T device. Internal closed flux surfaces can be studied in this manner with minimal perturbation because of the rapid transit of the plasma (translational velocity v/sub z/ approx. 10 cm/(MU)s). Data have been taken using a low-field (5 kG), 5-mtorr-D2 gas-puff mode of operation in the FRC source coil which yields an initial plasma density of approx. 1 x 10(15) cm(-3) and x/sub s/ approx. 0.04. FRCs translate from the approx. 25 cm radius source coil into a 20 cm radius metal translation vessel. Two translation conditions are studied: (1) translation into a 4 kG guide field (matched guide-field case), resulting in similar plasma parameters but with x/sub s/ approx. .45, and (2) translation into a 1 kG guide field (reduced guide-field case), resulting in expansion of the FRC to conditions of density approx. 3 x 10(14), external field B0 approx. 2 kG and x/sub s/ approx. 0.7. DOE

N84-30855# Los Alamos Scientific Lab., N. Mex.
INSTITUTIONAL SUPPORTING RESEARCH HIGHLIGHTS IN PHYSICS AND MATHEMATICS, FISCAL YEAR 1983
John C. Virgil, comp. Mar. 1984 36 p refs
(Contract W-7405-eng-36)
(DE84-011025; LALP-84-18) Avail: NTIS HC A03/MF A01

Highlights of FY 1983 Institutional Supporting Research and Development activities within the six Physics and Mathematics divisions and the Center for Nonlinear Studies are presented. The highlights are but a fraction of the ISRD activities in the Directorate and are intended to be a representative sample of progress in the various research areas. FY 1983 ISRD activities within the Physics and Mathematics divisions included both basic and applied research and were divided into 11 research areas: mathematics and numerical methods, low-energy nuclear physics, medium- and high-energy nuclear physics, atomic and molecular physics, solid-state physics and materials science, fluid dynamics, plasma physics and intense particle beam theory, astrophysics and space physics, particle transport methods, accelerator and fusion technology, and biophysics. Highlights from each of these areas are presented. DOE

N84-30856# Department of Energy, Washington, D. C.
DUAL APERTURE DIPOLE MAGNET WITH SECOND HARMONIC COMPONENT Patent Application
Walter F. Praeg, inventor (to DOE) Filed 31 Aug. 1983 17 p
(Contract W-31-109-eng-38)
(DE84-011305; US-Patent-Appl-SN-528278) Avail: NTIS HC A02/MF A01

An improved dual aperture dipole electromagnet includes a second harmonic frequency magnetic guide field winding which surrounds first harmonic frequency magnetic guide field windings associated with each aperture. The second harmonic winding and the first harmonic windings cooperate to produce resultant magnetic waveforms in the apertures which have extended acceleration and shortened reset portions of electromagnetic operation. DOE

N84-30857# Department of Energy, Washington, D. C.
BIASING AND FAST DEGAUSSING CIRCUIT FOR MAGNETIC MATERIALS Patent Application
William B. Dress, Jr. and David R. McNeilly, inventors (to DOE) Filed 4 Oct. 1983 12 p
(Contract DE-AC05-84OR-21400)
(DE84-011281; US-Patent-Appl-SN-539011) Avail: NTIS HC A02/MF A01

A dual-function circuit is provided which is used to both magnetically bias and alternately, quickly degauss a magnetic device. The circuit is magnetically coupled or directly connected electrically to a magnetic device, such as a magnetostrictive transducer, to magnetically bias the device by applying a dc current and alternately apply a selectively damped ac current to the device to degauss the device. The circuit is of particular value in many systems which use magnetostrictive transducers for ultrasonic transmission in different propagation modes over very short time periods. DOE

N84-30858# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
A 6.5 TESLA SSC LATTICE EXAMPLE
A. A. Garren Jan. 1984 7 p refs Presented at the Workshop on Accelerator Phys. Issues for a Superconducting Super Collider, Ann Arbor, Mich., 12-16 Dec. 1983
(Contract DE-AC03-76SF-00098)
(DE84-010719; LBL-17283; CONF-831264-14) Avail: NTIS HC A02/MF A01

An example SSC collider lattice for 20 TeV proton beams anti-symmetric insertions is presented. Author

N84-30859# Texas Univ., Austin. Inst. for Fusion Studies.
NONLINEAR DYNAMICS OF MAGNETIC ISLANDS WITH CURVATURE AND PRESSURE
M. Kotschenreuther, R. D. Hazeltine, and P. J. Morrison Mar. 1984 43 p
(Contract DE-FG05-80ET-53088)
(DE84-010968; DOE/ET-53088/135) Avail: NTIS HC A03/MF A01

Curvature and finite pressure are known to have a dramatic influence on linear magnetic tearing stability. An analytic theory of the nonlinear resistive growth of magnetic islands in Tokamaks is presented, including the interchange driving term. A Grad-Shafranov equation to describe the MHD equilibrium of thin islands is derived. The resistive evolution of these islands is then obtained. Interchange effects are found to become progressively less important with increasing island width. DOE

N84-30860# Los Alamos Scientific Lab., N. Mex.
COMMISSIONING TESTS OF THE BONNEVILLE POWER ADMINISTRATION 30 MJ SUPERCONDUCTING MAGNETIC ENERGY STORAGE UNIT
H. J. Boening and J. F. Hauer (Bonneville Power Administration, Portland, Oreg.) 1984 9 p refs Presented at the Power Eng. Soc. Summer Meeting, Seattle, 15 Jul. 1984
(Contract W-7405-eng-36)
(DE84-006033; LA-UR-84-348; CONF-840706-1) Avail: NTIS HC A02/MF A01

A 30 MJ (8.4 kWh) Superconducting Magnetic Energy Storage (SMES) unit with a 10 MW converter was installed and commissioned at the Bonneville Power Administration (BPA) substation in Tacoma, Washington. This is the first large-scale application in the US of superconductivity in an electric utility system. The unit, which is capable of absorbing and releasing up to 10 MJ of energy at a frequency of 0.35 Hz, was designed to damp the dominant power swing mode of the Pacific AC Intertie. The electrical characteristics of the magnetic energy storage unit, its modes of operation, results of device tests, means for controlling real and reactive power, and some initial power system response tests are described. A short summary of the operating history of the unit over the first eleven months is also presented. DOE

N84-30861# Bielefeld Univ. (West Germany). Zentrum fuer Interdiziplinaere Forschung.
A NONSTANDARD CONSTRUCTION OF LEVY BROWNIAN MOTION
Andreas Stoll (Ruhr University) May 1984 37 p refs
(Rept-82) Avail: NTIS HC A03/MF A01

A nonstandard construction of Levy Brownian motion on R sup d which extends Anderson's nonstandard representation of Brownian motion is presented. It involves a nonstandard construction of white noise and gives as a classical corollary a white noise integral representation of Levy Brownian motion. An invariance principle can be deduced in a similar way as Donsker's invariance principle follows from Anderson's construction. Author (ESA)

N84-30862# Joint Publications Research Service, Arlington, Va.
USSR REPORT: PHYSICS AND MATHEMATICS
6 Apr. 1984 34 p refs `Transl. into ENGLISH from various Russian articles
(JPRS-UPM-84-001) Avail: NTIS HC A03/MF A01

The following general topics were addressed herein: acoustics; crystals and semiconductors; electricity and magnetism; fluid dynamics; lasers and masers; nuclear physics; optics and spectroscopy; stress, strain, and deformation; superconductivity; thermodynamics; and mathematics. For individual titles, see N84-30863 through N84-30884.

N84-30863# Joint Publications Research Service, Arlington, Va.
EXCITATION OF SOUND BY LIGHT Abstract Only c71
F. Kh. Gelmukhanov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 1 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 2, Jan. 1984 p 309-311 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

The sound-producing interaction of light and a binary gas mixture was analyzed, with the assumption that only one component of the mixture absorbs light and its particles have a two-level structure. The other component plays the role of a buffer and its particles were assumed to be structureless. The wave equation describing acoustic vibrations in terms of the unbalance pressure differential was derived from the equations of gas dynamics. The solution was obtained in terms of Chapman-Cowling omega-integrals. A gas mixture inside a cylindrical resonator cavity and incident light with an intensity which oscillates in time at an acoustic frequency while remaining uniformly distributed over the cavity cross section were considered. The saturation factor, proportional to the light intensity, was assumed to oscillate at constant amplitude in time and to decrease exponentially along the light path. The time-average density of acoustic energy was calculated for the case of a laser beam with Gaussian transverse light intensity distribution impinging on a rigid ideally smooth wall of such a cylindrical gas container. The results confirm that light excites sound also in the special case of a gas without buffer. The results apply to generation of sound through light-induced drift converting random motion of gas particles to regular motion and from heat, as in the case of a radiation-collision antenna. Author

N84-30864# Joint Publications Research Service, Arlington, Va.

USE OF PELTIER EFFECT FOR SMALL SIGNAL AMPLIFICATION AND CONVERSION Abstract Only c35

Yu. I. Ageyev, M. M. Akperov, K. Z. Kobakhidze, and M. V. Nebuchinov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 2 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1396-1400 (For primary document see N84-30862 20-70)

Avail: NTIS HC A03/MF A01

It is possible to use thermocouples operating as heat pumps with small temperature gradients to effect the control of elements whose properties are temperature dependent. This enables the construction of a number of electrical and optical signal transducers. The cooling or heating gain of a thermocouple used as a heat pump is proportional to the ratio of the cold or hot junction temperature to the temperature drop across the thermocouple. As this temperature gradient becomes quite small, the efficiency of such converters theoretically rises without limit. Under these conditions, the thermocouple can control any device whose properties change sharply in a narrow temperature range. Simple circuits for small signal amplification, frequency conversion, and detection were discussed. The gain of one such amplifier was plotted as a function of the input signal using various metal-semiconductor phase transition devices; the detection gain was plotted as a function of the input signal for a posistor and a metal-semiconductor phase transition device. Gains on the order of 100 and more were obtained with the latter. While such devices have the advantage of electrically isolating the input from the output, the speed is governed primarily by the rate of the thermal processes and is approximately inversely proportional to the square of thermocouple branch length. The speed is presently limited to tens of milliseconds, though with the transition to film technology, it may increase by a few orders of magnitude. Author

N84-30865# Joint Publications Research Service, Arlington, Va.

DETECTING OPTICAL POLARIZATION OF NUCLEI IN SEMICONDUCTORS WITH SUPER-CONDUCTING QUANTUM INTERFEROMETER Abstract Only c35

L. S. Vlasenko, N. V. Zavaritskiy, and V. G. Fleysher *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 3 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1377-1381 (For primary document see N84-30862 20-70)

Avail: NTIS HC A03/MF A01

A superconducting quantum magnetic flux meter (SKIMP) to detect nuclear spin polarization as a result of optical pumping of a silicon crystal is described. Nuclear magnetic resonance was used to identify the nature of the light-induced magnetism. Single silicon crystals cut in the form of a cylinder 6 mm in diameter and 10 mm high were used as samples in the center of the cylindrical SKIMP. The silicon contained radiation defects with neutron irradiation. Nonequilibrium nuclear magnetization of the sample was achieved by illuminating it at 77 K with the unpolarized light from a 1 kW incandescent lamp in a constant magnetic field of about 300 Gs for one to two hours. The exposure of the electron spin system of the semiconductor to light in a magnetic field was accompanied by a decrease in the temperature of the Si29 nuclei of the lattice. The long spin-lattice relaxation time of Si29 nuclei (more than three hours at 77 K) made it possible to transfer the samples to the SKIMP and conduct long term measurements at a low spin temperature. The use of a calibration coil permitted the determination of the magnetic moment of the sample and the degree of polarization of the nuclear moments which takes place with the illumination. Author

N84-30866# Joint Publications Research Service, Arlington, Va.

NEW PHASE TRANSITION IN SI AND GaAs EXPOSED TO PICOSECOND LASER PULSES Abstract Only c76

Zh. I. Alferov, Yu. V. Kovalchuk, Yu. V. Pogorelskiy, O. V. Smolskiy, and I. A. Sokolov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 4 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1373-1376 (For primary document see N84-30862 20-70)

Avail: NTIS HC A03/MF A01

Experimental data indicate that a time scale of 10 to the minus 10th power seconds is sufficient to heat a semiconductor to the melting point. The melt is formed only when the energy imparted to the semiconductor exceeds the latent heat of fusion. The entire heated region then changes into the melt without forming the nucleus of a new phase, which confirms the capability of substantially overheating a chip with a short laser pulse. This and other arguments in favor of the hypothesis of the existence of a new phase transition point in Si and A3B5 below the formation point of the ordinary metallic melt are adduced. Relevant experimental data supporting the existence of a new phase transition point are reviewed briefly in a nonmathematical format. Author

N84-30867# Joint Publications Research Service, Arlington, Va.

IMPACT OF WEAK ELECTRIC FIELD ON PHOTOCONDUCTIVITY OF MODIFIED VITREOUS As2Se3 Abstract Only c76

S. Ye. Abdulgafarov, V. L. Averyanov, and V. M. Lyubin *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 4-5 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1371-1373 (For primary document see N84-30862 20-70)

Avail: NTIS HC A03/MF A01

Nickel-modified films of As2Se3 0.3 to 0.5 micrometers thick were excited by an He-Ne laser modulated at a frequency of 200 Hz in order to study the photoconductivity. The latter was plotted as a function of the applied voltage for temperatures of 25 C and 125 C. At the former room temperature, the photoconductivity initially rises in step with the increase in the electric field, goes through a maximum, and then falls off sharply. At 125 C, the rising portion of the curve is practically eliminated, and the drop in the photoconductivity begins immediately. This behavior was observed at voltages plotted between values of log(U) (in volts) of 0.2 and 2.0. These aspects of the photoconductivity are apparently best treated from the standpoint of the existence of drift and recombination barriers in transition metal (Ni, Fe, Mo)-modified As2Se3 for the nonequilibrium charge carriers. The decisive factor in the electric field intensity range where the rise in the photoconductivity is observed at 25 C is the decrease in drift barriers for the majority carriers. An increase in temperature apparently has a greater impact on recombination processes than on majority carrier drift. Author

N84-30868# Joint Publications Research Service, Arlington, Va.

IMPACT OF LASER RADIATION ON OPTICAL PROPERTIES OF POLYMER LIQUID CRYSTAL IN PHASE TRANSITION RANGE Abstract Only c27

S. A. Ivanov, I. A. Yakovlev, V. Yu. Vetrov, S. G. Kostromin, and V. P. Shibayev *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 5-6 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1349-1353 (For primary document see N84-30862 20-70)

Avail: NTIS HC A03/MF A01

Polymer liquid crystals have the capability of retaining a particular oriented structural state at a temperature below the glass point if the polymers are cooled in the presence of an external electric or magnetic field. The influence of focused laser radiation on the optical properties of PA-5 polyacrylate with cyandiphenyl mesogenous groups incorporated in the lateral branch structures of the macromolecules close to the point of the phase transition from the liquid crystal state to an isotropic melt was investigated.

With the exposure of a homeotropically oriented sample in a 500 Hz AC electric field to such laser radiation, nonlinear refraction was detected. Increasing intensity led to a widening of the transiting beam and a distortion of its profile. The broadening was a function of the temperature and incident power. When the polymer surface was observed in unfocused laser light at a point of previous exposure to a focused beam, a dark contrast spot was observed. The appearance of this optical inhomogeneity was due to the formation of the isotropic phase. Subsequent cooling produced a disoriented, strongly light scatterint texture at this point. The application of an electric field restorted the homeotropic orientation at places where it was previously disrupted. Author

N84-30869# Joint Publications Research Service, Arlington, Va.
NONCUBIC MAGNETIC ANISOTROPY IN YSmLuCaFeGe GARNET FILMS Abstract Only c76
V. V. Volkov, M. Marysko, M. Nevrziva, M. Polcarova, and M. Cermak *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 6 Transl. into ENGLISH from Fiz. Tverdogo Tela (Leningrad), v. 25, no. 10, Oct. 1983 p 3086-3090 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

Garnet films (YSmLuCaFeGe) were investigated to determine the dependence of their noncubic magnetic anisotropy on the technological conditions. Three series of such films were deposited on Gd3Ga5O12 substrates with (111)-orientation. All specimens contained the same amounts of garnetizing oxides and somewhat more Ca than Ge, but different amounts of PbO-B2O3 solvent in each series so that each of the three melts had a correspondingly different saturation temperature. The composition of the films was measured by microanalysis with an electronic probe, the thickness was measured by the interference method, and the saturation magnetization was measured by the Cullen-Josephs method. The constant of uniaxial magnetic anisotropy was determined from ferromagnetic-resonance measurements and Cronemeyer relations. Growth-induced magnetic anisotropy was studied with the aid of heat treatment. The results reveal an intricate dependence of uniaxial magnetic anisotropy on the film annealing temperature. This is attributed to the existence of two anisotropy components, a positive uniaxial one and a negative easy plane one. The dependence on the film deposition temperature was found to be much simpler, the anisotropy constant decreasing consistently with increasing deposition temperature. It was also found to increase consistently with increasing rate of film growth. Author

N84-30870# Joint Publications Research Service, Arlington, Va.
POLARIZATION OF PARAEXCITON LUMINESCENCE IN Cu2O CRYSTALS IN MAGNETIC FIELD Abstract Only c76
S. V. Gastev, Ye. L. Ivchenko, G. Ye. Pikus, N. S. Sokolov, and N. L. Yakovlev *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 7 Transl. into ENGLISH from Fiz. Tverdogo Tela (Leningrad), v. 25, no. 10, Oct. 1983 p 3002-3008 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

Cuprous oxide was the first material revealing the existence of excitons and it has become the model material for study of Mott-Wannier excitons. In this connection, magnetically induced circular polarization of paraexcitons in Cu2O crystals offers excellent means of reliably determining to what extent mixing of wave functions contributes to luminescence associated with transitions between nondegenerate states without participation of Zeeman splitting of the initial state and the final state. For an experimental study of this problem specimens of Cu2O crystals were grown by the hydrothermal method from copper hydroxide and then immediately immersed in liquid helium at $T = 1.6$ K. Luminescence was excited by means of an argon laser (lambda = 5145 A) and a magnetic field of $H = 6$ T intensity was produced by means of a superconducting solenoid. The luminescence, observable along the magnetic field, was analyzed with a DFS-12 spectrometer, its I(+)-I(-) signals with magnetically induced circular polarization being coupled out by an acoustooptic quartz modulator with polaroid film. The results have revealed a phononless orthoexciton line A and its three phononic recurrences. B.W.

N84-30871# Joint Publications Research Service, Arlington, Va.
ELECTRON-MICROSCOPIC MICROSTRUCTURAL EXAMINATION OF GLASSY Ge-Se SEMICONDUCTORS Abstract Only c76
V. A. Marikhin, T. N. Mamontova, and V. A. Nikitin *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 8 Transl. into ENGLISH from Fiz. Tverdogo Tela (Leningrad), v. 25, no. 10, Oct. 1983 p 2923-2929 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

The microstructure of glassy Ge-Se semiconductors was studied under an electron microscope, synthetic GeSe2 being an important representative of the Ge-Se system. Specimens of this material had been produced by heating a mixture of Ge with electrical resistivity of 50 ohm cm and 99.999% pure Se in a T-40-600 tubular vacuum furnace to 1000 C at a rate not exceeding 150 C/h and holding at this temperature for 40-50 h prior to quenching the melt at a rate within 100-200 C/s. Examination under a JEM-5Y microscope with an acceleration voltage up to 100 kV revealed microdomains (200-300 A) and minidomains (1000-2000 A) forming macrodomains (3-4 micron). This confirms the hypothesis, based on earlier laser spectrophotography and luminescence measurements, that these glassy materials are heterogeneous with inclusions of fine imperfect crystallites. The replicas indicate also that microdomains with unsaturated bonds and carrying electric charges may be forming during segregation of phases. Author

N84-30872# Joint Publications Research Service, Arlington, Va.
INSTABILITY OF COLLAPSING CYLINDRICAL SHELL DURING MAGNETIC ENERGY DENSITY Abstract Only c32
A. I. Pavlovskiy, M. I. Dolotenko, N. P. Kolokochikov, A. I. Bykov, N. I. Yegorov, and O. M. Tatsenko *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 9 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1360-1364 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

A shaped explosive charge type magnetic field generator was used to produce a collapsing shell around a megagauss magnetic field. The initial shell diameter was 139 mm. The dynamics of the shell shape change was studied by transilluminating the magnetic shaped charge generator with bremsstrahlung from a nonferrous pulsed betatron. X-ray photographs taken perpendicular to the magnetic field generator axis show the collapse of the shell between 14.5 microseconds into the process, when the magnetic field in the 33 mm diameter cavity was 2.7 MGs and 16.7 microseconds, when the cavity diameter was 18 mm and the field in it was 6.2 MGs. This paper demonstrates for the first time that the instability of the motion of the internal surface of a shell compressed by an ultrastrong magnetic field limits the growth of the magnetic energy density. Author

N84-30873# Joint Publications Research Service, Arlington, Va.
EXCITATION OF QUASI-STATIC MAGNETIC FIELDS IN AXIAL STRUCTURES Abstract Only
A. G. Karpenko, L. A. Lobachevskiy, and V. V. Migulin *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 9-10 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, no. 2, Sep. 1983 p 344-346 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

A quasi-static magnetic field excited in air above the sea surface by a quasi-steady alternating electric current flowing through an insulated conductor in water, with water serving as the return path, has been found to have not a dipole structure as in the case of a closed currrent loop but an axial structure as in the case of a straight wire. The intensity of such a magnetic field in air, beyond the water surrounding the conductor, is determined by the current in the conductor only and does not depend on the current in water. Measurements confirm theoretical calculations very closely, namely that the magnetic field intensity decreases with increasing distance from the conductor according to the inverse-square rather than the inverse cube relation. This can be of practical significance for radiating stronger quasi-static magnetic fields especially at low frequencies. Author

N84-30874# Joint Publications Research Service, Arlington, Va.
INERTIAL AND SHEAR FLOW Abstract Only c34
V. V. Aleksandrov and Yu. D. Shmyglevskiy *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 11 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 2, Jan. 1984 p 280-283 Previously announced in IAA as A84-22790 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

A study is made of simple fluid flows with rectilinear uniform motion of particles, such as flows of geophysical liquids. The properties of inertial flows are briefly discussed, and several examples are examined. A class of viscous fluid flows is identified where the flow is dependent on ten arbitrary constants. V.L. (IAA)

N84-30875# Joint Publications Research Service, Arlington, Va.
NEW LASING FERROELECTRIC MATERIAL Pb5Ge3O11-Nd-3(+) Abstract Only c36
A. A. Kaminskiy, G. D. Kursten, and D. Schultze *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 12 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 270, no. 6, Jun. 1983 p 1373-1376 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

A study was made to achieve lasing in Pb5Ge3O11-Nd (3+), a trigonal ferroelectric crystal, the feasibility having been established by the results of earlier luminescence spectrum analysis. Single crystals of this material were synthesized by the Czochralski method from optical-grade lead germanate with high concentration of neodymium ions, under precisely controlled physico-chemical conditions including compensation of excess charge carriers with potassium ions. Lasing was excited at 77 and 300 K with a low energy thereshold on the 4f(3/2)4I(11/2) inter-Stark transition. This new laser source in an optically positive crystal with one center and ordered structure, its transparency window is 0.5-4 micron, its melting point and Curie point are about 1010 and 450 K respectively. The results of this study confirm the feasibility of eeo phase synchronism. B.W.

N84-30876# Joint Publications Research Service, Arlington, Va.
HIGH-Q OPEN RESONATOR STRUCTURES WITH SPARSE SPECTRUM Abstract Only c33
A. A. Kurayev, Ye. I. Nefedov, A. Ya. Slepyan, and G. Ya. Slepyan *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 13 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, no. 1, Sep. 1983 p 94-97 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

The feasibility of producing coaxial open resonator structures with high Q-factor and sparse spectrum is considered, the gist being to use magnetic modes with higher-order radial index (H(MN), N not equal to 1). Such modes are neither exactly space modes nor exactly boundary modes but combine some characteristics of both. The principle of operation of such a resonator is cutting off a waveguide mode between two critical sections. The heat loss, characterized by the frequency-independent parameter delta = delta kQ (delta - field penetration depth in metal, k - wave number, Q - ohmic storage factor), is calculated approximately by using the Shukin-Leontovich impedance boundary conditions and applying the perturbation method to the surface impedance of the mirror material. For comparison, the heat loss in an open resonator structure operating with boundary modes is calculated analogously. Theoretical estimates agree fairly closely with experimental data. A frequency-tunable high-Q open resonator should be realizable by resorting to a biconic structure, with the outer conductor slightly tapering and the inner conductor movable. Author

N84-30877# Joint Publications Research Service, Arlington, Va.
PLASMA IN DIVERTER DURING INTENSE RECYCLING Abstract Only c75
A. V. Nedospasov and M. Z. Tokar *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 14 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 270, no. 6, Jun. 1983 p 1376-1380 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

Diverters are being developed for plasma scrubbing and pumping in future helium reactors, with plasma flowing along the Tokamak walls being extracted parallel to the magnetic field into a special compartment where it is cooled and neutralized by the diverter plates. For design and performance calculations, made before by intricate numerical methods, an analytical model is proposed here applicable to deuterium-tritium plasma under conditions of intense recycling. Selected as the physical model is a poloidal diverter where charged particles return to the plasma as atoms after neutralization at the plates and here again become charged. This cycle is described by one-dimensional equations of kinetics for molecules and for atoms, taking into account ionization and dissociation, and equations of continuity and heat condition for the plasma. Heat and charge transfer across the magnetic field is negligible so that only transfer along the magnetic field needs to be considered. These equations are supplemented with the equation of motion for the plasma as an entity along the magnetic field, with friction between ions and atoms during charge transfer. The boundary conditions are stipulated in terms of integral heat and particle fluxes. The system of equations is solved on the basis of two-velocity distribution functions. B.W.

N84-30878# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF PLASMA CORONA ON SPHERICAL TARGETS IRRADIATED BY LASER Abstract Only c75
Yu. A. Zakharenkov, N. N. Zorev, A. A. Rupasov, G. V. Sklizkov, and A. S. Shikanov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 15 Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzaimodeystviye Lazernogo Izlucheniya S Termoyadernymi Mishenyami (Moscow), v. 133, 1983 p 146-188 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

Interaction of laser radiation and plasma corona on a target is analyzed on the basis of experimental data from the Kal'mar laser facility and theoretical relations describing the plasma corona hydrodynamics. Important factors determining the dynamics of plasma corona are deformation of the plasma density profile and acceleration of charged particles. The hydrodynamic parameters and the effect of initial perturbations are evaluated, accordingly, on the basis of data on evolution of the density profile, those data having been obtained with a special diagnostic optical system including a KDP crystal and a Jamin interferometer. Studies of plasma dynamics within the region of critical radiation flux density were made by photographic recording with space and time resolution, the second-harmonic emission spectrum yielding the propagation velocity of that region and the 3/2 omega sub zero emission spectrum with two components on both sides of the 2/3 lambda sub zero wavelength yielding the electron temperature of the plasma corona. An ion collector with negative grid electrode and an ion collector with negative bias around a spherical target, with an electrostatic ion analyzer and a secondary-emission multiplier behind the second collectors were used for determining the energy spectrum and the charge content of ions. B.W.

N84-30879# Joint Publications Research Service, Arlington, Va.
HEATING AND IMPLOSION OF SPHERICAL TARGETS IRRADIATED BY LASER Abstract Only c36
B. L. Vasin, A. A. Yerokhin, N. N. Zorev, A. A. Kologrivov, A. S. Rupasov, G. V. Sklizkov, and A. S. Shikanov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 16 refs Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzimodeystviye Lazernogo Izlucheniya s Termoyadernymi Mishenyami (Moscow), v. 133, 1983 p 51-145 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

The state of the art in implosion of shell targets by means of laser irradiation is reviewed, with emphasis on methods and results of evaluating the target compression parameters. The process begins with absorption of laser energy and heatup of the target, much information being provided by X-radiation from the corona region of the target plama. The Kal'mar 9-channel laser facility with a series parallel amplifier system was developed and subsequently modified for experimental study of laser fusion processes in targets. It consists of a YAG master laser with space filters and modulation, a short duration pulse shaping circuit, preamplifier stages, power amplifier stages, beam focusing and homing optics, and a vacuum chamber with diagnostic instruments. Spectral analysis and synthesis of laser radiation with the aid of a Fabry-Perot interferometer yielded data on the spectrum evolution and the intensity energy characteristics including time parameters and directivity as well as contrast. R.J.F.

N84-30880# Joint Publications Research Service, Arlington, Va.
CONTROL COMPUTER AND AUTOMATION SUBSYSTEM EQUIPMENT IN DELFIN FACILITY Abstract Only c60
A. P. Allin, Yu. M. Belenkiy, Yu. V. Borzyak, N. Ye. Bykovskiy, V. Ye. Grigoryev, B. S. Gusyatnikov, I. L. Doroshkevich, V. V. Ivanov, A. G. Kuchinskiy, and V. M. Savchenko *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 17 refs Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzimodeystviye Lazernogo Izlucheniya s Termoyadernymi Mishenyami (Moscow), v. 133, 1983 p. 19-50 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

The power equipment of the Del'fin laser facility contains a 10,000,000 J capacitor bank divided into four identical sections feeding a power preamplifier and three output stages each, with 328 IFP-2000 flash tubes designed to produce 2.5 kJ laser radiation. The system for controlling and automating laser experiments includes a computer complex in the central console and the sequential ring bus, with peripheral stations inside the optical chamber including three microcomputers. The control computer with a 28 K memory is linked to a KE-11V arithmetic unit, the subsidiary computer with a 28 K memory is linked to the CAMAC stations and to a terminal DECWRITER-II. The system crate contains a 9030/32 interface, a 3992 driver for the sequential bus, and a 064 LAM GRADER interrogation processing module. The computer complex also includes an RSX-11M multiprogram multipurpose real time disk operating system which uses standard DECNET-11 software and includes a translator from MACRO-11 assembler language to FORTRAN-4, BASIC-11, COBOL and a few other languages. R.J.F.

N84-30881# Joint Publications Research Service, Arlington, Va.
STUDIES OF AMPLIFIER MODULE IN DELFIN FACILITY FOR HEATING THERMONUCLEAR PLASMA Abstract Only c75
N. G. Basov, B. L. Vasin, A. A. Galichiy, A. Ye. Danilov, B. Yu. Ivanov, M. P. Kalashnikov, B. V. Kruglov, Yu. A. Mikhaylov, and V. P. Osetrov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 18 refs Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzaimodeystviye Lazernogo Izlucheniya s Termoyadernymi Mishenyami (Moscow), v. 133, 1983 p 3-18 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

The laser fusion facility, Del'fin, for heating targets in a spherical radiation geometry consists of four functionally independent power amplifier modules, each capable of forming 54 laser beams 45 mm in diameter and variously grouping them together. A module consists of a linear preamplifier, three amplifiers and three output stages in cascade, also spherical and cylindrical intermediate collimators containing space filters with circular and slot diaphragms respectively. Each amplifier contains cells with active elements splitting the incident laser beam successively into 2, 6, 18, 54 beams. These 54 component beams are variously combined in the output stages. The focusing system was designed with a 1:2 aperture ratio for beam divergence angle of the order of 0.001 rad, illuminance nonuniformity not exceeding a few percent of the mean illuminance, and tautochromism of all component beams not worse than 0.5 cm. Automatic target search and homing as well as beam tracking along three space coordinates were incorporated with the design. Each focusing channel consists of a multiprism mirror, a long focus first lens, a corrective and diverting plate, a rotatable mirror, and a short focus camera lens with 1:26 aperture ratio concentrating the radiation on the target. R.J.F.

N84-30882# Joint Publications Research Service, Arlington, Va.
HOLOGRAPHIC IMAGE SUBTRACTION BY RECORDING IN FOURIER PLANE AND SPACE FILTRATION WITH THIN LIGHT BEAM Abstract Only c35
I. S. Klimenko, S. N. Malov, and V. P. Ryabukho *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 19 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, Sep. 1983 p 365-369 Original language document previously announced in IAA as A84-11363 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

A simple holographic method of image subtraction is proposed which ensures a sufficiently high brightness of the difference image without one of phase shifters. Its gist is double exposure of the Fourier hologram on which the two images were recorded with a small relative transverse shift, followed by the illumination with a thin laser beam for space filtration and subsequent optical Fourier transformation of the reconstructed field. The method is based on the theory of a diffusely illuminated transparency and the interference pattern of coherent light in the Fourier plane. The method was tested experimentally on a piece of chalk whose surface microrelief had been altered mechanically during the time between two successive exposures. Measurements with a standard optical gauge revealed formation of the difference image with insignificant background noise but rather appreciable speckle noise, the latter limiting the resolution to only 0.05 mm unless reduced by further filtration with a laser beam of oblong cross section. R.J.F.

N84-30883# Joint Publications Research Service, Arlington, Va.
MICROSPECTROPHOTOMETER FOR CRYSTAL ANALYSIS BY ABSORPTION REFLECTOMETRY Abstract Only c35
G. V. Papayan and L. S. Agroskin *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 19-20 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, no. 1, Sep. 1983 p 97-100 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

A recording polarization microspectrophotometer using transmitted or reflected light was built for optical analysis of crystals with the specimen in the same position for both modes of measurements. The equipment consists of a main light source, a diffraction monochromator, a beam splitter and delay line (lens, diaphragm, vibrating biprism, V-mirror and spherical mirror, another diaphragm, another lens), a reflection transmission switching 45 deg mirror, a polarizer, a small cubic prism with specular diagonal plane for reflection spectrophotography or a large cubic prism with semitransparent diagonal plane for transmission spectrophotography with an auxiliary light beam coming from a lateral source through a diaphragm and the switching mirror, and around either prism a reference objective with mirror behind, a photocathode receiver tube, an ocular behind a rotatable analyzer and a flappable-prism, and a main objective followed by a microscope stage with the specimen, then a condenser, and a switching 45 deg mirror reflecting into it light from a second auxiliary source with diaphragm and passing light to a second photocathode receiver tube. R.J.F.

N84-30884# Joint Publications Research Service, Arlington, Va.
NATURE OF POLARIZED VIBRONIC SIDEBANDS OF BIEXCITON ABSORPTION IN ALPHA-OXYGEN
Yu. B. Gaydidey, V. M. Loktev, V. S. Ostrovskiy, and A. F. Prikhotko *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 20-21 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 272, no. 1, Sep. 1983 p 62-64 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

It was ascertained that absorption of light in the 1500-13,000 cm region by alpha oxygen in many polycrystalline substances is attributable to generating of biexcitons with small radii. It was first assumed that in all red (Delta-Delta transition) and ultraviolet (sigma-sigma transition) vibronic bands 20-30 cm away from strong exciton-vibron lines there are clusters of weak lines originating independent secondary small vibrational line clusters. This concept was subsequently contradicted by experimental evidence of distinct polarization of those primary line clusters that are associated with vibrations in the crystal; it is necessary to explain the rather wide frequency defect (Debye frequency omega sub D approximately equals 100 K in alpha-oxygen) as well as the polarization. Such an explanation is given in accordance with the biexciton theory of absorption, with a crystal regarded as an array of interacting molecular layers, and taking into account the relatively weak interplanar interaction. An analysis on this basis indicates consistently and convincingly that polarization of the first major satellites in exciton-vibronic bands can be associated with equipairwise components of biexciton splitting by interplanar interaction in oxygen molecules. R.J.F.

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N84-30885 British Library Lending Div., Boston Spa (England).

SCOPE FOR ACTIVE NOISE ABATEMENT IN VEHICLE DIESEL ENGINES

Ingomar Summerauer and Norbert Boesch 25 Apr. 1984 57 p refs Transl. into ENGLISH of "Moeglichkeiten Aktiver Laermbekaempfung an Fahrzeug-Dieselmotoren" presented at the 17th Intern. Congr. of the Federation Internationale des Societes d'Ingenieurs des Techniques de l'Automobile, 1978 Congr. held in Budapest, 4-10 Jun. 1978

(BLL-M-28767-(5825.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Noise reduction measures must be directed to the engine, the exhaust system, and the cooling system (fan) all of which contribute approximately 90% of the sound energy emitted from commercial diesel trucks. The noise generation processes were visualized and limiting conditions fixed by law were considered in establishing criteria for active solar noise abatement measures. A more effective silencer and better vibration damping on the surface of the silencer and exhaust pipes can reduce noise from the exhaust system. Acoustic emission generated by the fan and air flow can be reduced by decreasing flow velocity or by turning on the fan only when a full cooling output is required (10% of the time). Active measures are needed on the engine itself either at the point of the solid-borne sound transmission or at the point of the solid-borne vibrations. The predominant effect is on the engine casing; oil sump; air suction pipe or air charge line; the flywheel casing; and the clutch housing. A.R.H.

N84-30886*# Lord Corp., Erie, Pa.

ACTIVE ATTENUATION OF PROPELLER BLADE PASSAGE NOISE

J. M. Zalas and J. Tichy Jul. 1984 86 p refs

(Contract NAS1-17231)

(NASA-CR-172386; NAS 1.26:172386) Avail: NTIS HC A05/MF A01 CSCL 20A

Acoustic measurements are presented to show that active cancellation can be used to achieve significant reduction of blade passage noise in a turboprop cabin. Simultaneous suppression of all blade passage frequencies was attained. The spatial volume over which cancellation occurred, however, is limited. Acoustic intensity maps are presented to show that the acoustic input to the fuselage was sufficiently non-localized so as to require more judicious selection of cancellation speaker location. Author

N84-30887*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE INFLUENCE OF A WIND TUNNEL ON HELICOPTER ROTATIONAL NOISE: FORMULATION OF ANALYSIS

Marianne Mosher Jul. 1984 30 p refs

(NASA-TM-85982; A-9815; NAS 1.15:85982) Avail: NTIS HC A03/MF A01 CSCL 20A

An analytical model is discussed that can be used to examine the effects of wind tunnel walls on helicopter rotational noise. A complete physical model of an acoustic source in a wind tunnel is described and a simplified version is then developed. This simplified model retains the important physical processes involved, yet it is more amenable to analysis. The simplified physical model is then modeled as a mathematical problem. An inhomogeneous partial differential equation with mixed boundary conditions is set up and then transformed into an integral equation. Details of generating a suitable Green's function and integral equation are included and the equation is discussed and also given for a two-dimensional case. Author

N84-30888*# Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.

EXPERIMENTAL STUDY OF NOISE TRANSMISSION INTO A GENERAL AVIATION AIRCRAFT

R. Vaicaitis, D. A. Bofilios, and R. Eisler Jun. 1984 153 p refs

(Grant NsG-1450)

(NASA-CR-172357; NAS 1.26:172357) Avail: NTIS HC A08/MF A01 CSCL 20A

The effect of add-on treatments on noise transmission into a cabin of a light aircraft was studied under laboratory conditions for diffuse and localized noise inputs. Results indicate that stiffening skin panels with honeycomb would provide on the average 3dB to 7 dB insertion loss over the most of selected frequency range H1 to 1000 Hz. Addition of damping tape on top of the honeycomb treatment increases insertion loss by 2dB to 3dB. Porous acoustic blankets show no attenuation of transmitted noise for frequencies below 300 Hz. Insertion of impervious vinyl septa between the layers of porous acoustic blankets do not provide additional noise reduction for frequencies up to about 500 Hz. Similar behavior was observed for noise barriers composed of urethane elastomer, decoupler foam and acoustic foam. A treatment composed from several layers of acoustic foams does not increase noise attenuation for the entire frequency range studied. An acoustic treatment composed of honeycomb panels, constrained layer damping tape, 2 to 3 inches of porous acoustic blankets, and limptrim which is isolated from the vibrations of the main fuselage structure seems to provide the best option for noise control. A.R.H.

N84-30889# Brookhaven National Lab., Upton, N. Y. Applied Mathematics Dept.

A FINITE ELEMENT METHOD FOR TREATING NEARLY ONE WAY WAVE PROPAGATION

C. I. Goldstein 1984 10 p refs Presented at the 5th IMACS Intern. Symp., Bethlehem, 19 Jun. 1984

(Contract DE-AC02-76CH-00016)

(DE84-010294; BNL-34552; CONF-8406113-2) Avail: NTIS HC A02/MF A01

A numerical method is described for approximately solving stationary wave propagation models for which the propagation is, for the most part, occurring in one principal direction. This occurs, for example, in connecting with the exterior scattering problem at distances sufficiently far away from the obstacle. This also frequently occurs in wave propagation problems in a duct or waveguide (including underwater acoustic wave propgation). The numerical method is based on first factoring out the main propagation direction is the solution and then applying the finite element method. Since the solution being approximated is much smoother, it is seen that there is a great reduction in the number of grid points compared to standard finite element and finite difference methods. This is validated by means of numerical experiments. DOE

N84-30890# SACLANT ASW Research Center, La Spezia (Italy).
WIND-GENERATED NOISE IN SHALLOW WATER
M. C. Ferla and W. A. Kuperman 1 Apr. 1984 21 p
(AD-A141981; Saclantcen-SR-79) Avail: NTIS HC A02/MF A01 CSCL 20/1

An experiment was conducted in a shallow water region of the Mediterranean Sea to study wind-generated noise. In addition to measuring the noise field, propagation-loss data were collected and used in a detailed modelling of the environment. The environmental information was then used as input to a noise model based on wave theory that computes the noise field in the water column for a given (unknown) source strength. By comparing model predictions with data, the influence of the environment on recorded noise levels could be removed and a measure of the noise source spectrum levels obtained as a function of wind speed, which is the parameter that was determined to be more closely correlated to the noise level than is wave height. GRA

N84-30891# Woods Hole Oceanographic Institution, Mass.
UNDERSEA ACOUSTIC RESEARCH Final Technical Report, 1 Jan. 1977 - 28 Feb. 1983
R. C. Spindel Jan. 1984 22 p
(Contract N00014-77-C-0196)
(AD-A142339; WHOI-84-4) Avail: NTIS HC A02/MF A01 CSCL 20/1

This is the final report of Contract N00014-77-C-0196 between the Woods Hole Oceanographic Institution and the Office of Naval Research for the contract period 1 January 1977 to 28 February 1983. This contract supported a broad program of research and development in underwater acoustics related to present and future Navy systems and requirements. The bulk of this contract research was conducted from 1977 to 1981, during which time the categories outlined below were all areas of active research. (Between 1981 and 1983 the contract remained in effect, although only in the area of bottom acoustics and at a reduced level.) The primary contract products are the published technical reports and papers listed below. These reports give detailed descriptions of the research work and the specialized techniques, methods, and instrumentation developed to support this research program. The final report contains a brief review of the program highlights and a bibliography of associated reports. GRA

N84-30892# Bolt, Beranek, and Newman, Inc., Canoga Park, Calif.
OVERGROUND EXCESS SOUND ATTENUATION (ESA). VOLUME 2: ANALYSIS OF DATA FOR FLAT GRASSY TERRAIN CONDITIONS Final Report, Aug. 1982 - Feb. 1984
Dwight E. Bishop Wright-Patterson AFB, Ohio Aerospace Medical Research Lab. Feb. 1984 183 p
(Contract F33615-82-C-0501)
(AD-A142420; BBN-5324; AFAMRL-TR-84-017-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 20/1

Analysis of the ESA data acquired under the Air Force measurements at Wright-Patterson AF Base show the expected large variations with weather and ground surface conditions for flat grassy terrain. Multiple linear regression analyses show low to moderately high correlations of excess attenuation data with the wind component in the direction of sound propagation, the temperature gradient and the ground surface (grass or snow). A characteristic of the data is the maximum excess attenuation typically occurring between 160 and 250 Hz which is related to the ground impedance. This maximum is evident in all data except under large negative wind component and negative temperature gradient conditions. Theoretical calculations show a reasonable fit of the ESA data for surface flow resistivity values of 100 to 200 cgs units for grass and 20 to 50 cgs units for snow. The extent of changes in ESA values with changes in wind component or temperature gradient varies considerably with frequency and distance. At low frequencies, typically 25 to 100 Hz, attenuation values generally show well-ordered increases with decreasing wind component and temperature gradient values. At frequencies above about 300 Hz, ESA sensitivity to wind component and temperature gradient increases, with generally a greater range of change occurring for negative values of wind component and temperature gradient than for positive values. Comparison of the ESA values for near zero wind component and neutral temperature conditions with theoretical models shows general good fit if one allows for a moderate increase in the flow resistivity with distance. GRA

N84-30893# Pennsylvania State Univ., University Park. Applied Research Lab.
ON MEASURING THE ACOUSTIC INTENSITY OF HYDROACOUSTIC SOURCES
G. C. Lauchle 25 May 1984 23 p
(Contract N00024-79-C-6043)
(AD-A142484; ARL/PSU/TM-84-91) Avail: NTIS HC A02/MF A01 CSCL 20/1

With the recent interest in using two-microphone technique to measure acoustic intensity, fundamental questions arise when considering this method for hydroacoustic studies. The acoustic intensity generated by a hydrodynamic source is related solely to those pressure components that propagate. The basic questions are then, what influence does the nonpropagating hydrodynamic pressure fluctuations have on the intensity probe when used in the nearfield of the source and can their effect be removed from a measured intensity spectrum? These two questions are addressed in this paper. An example indicates that the non-propagating pressure fields of a turbulent boundary layer flow can be accounted for approximately. The result is not generally applicable to three-dimensional fields, however. Author (GRA)

N84-30894# Delaware Univ., Newark. Dept. of Mathematical Sciences.
[INVERSE SCATTERING PROBLEM] Interim Scientific Report, 1 May 1983 - 30 Apr. 1984
D. L. Colton 25 Apr. 1984 13 p
(Grant AF-AFOSR-0329-82)
(AD-A142634; AFOSR-84-0502TR) Avail: NTIS HC A02/MF A01 CSCL 20/1

Abstracts are presented for seven papers with titles including, Uniqueness of solutions to the inverse acoustic scattering problem, Far field patterns in acoustic and electromagnetic scattering, Dense sets and far field patterns in electromagnetic wave propagation, The inverse scattering problem for time harmonic acoustic waves, and The strong maximum principle for the heat equation. GRA

N84-30895# Department of Energy, Washington, D. C.
THERMOACOUSTIC COUPLE Patent Application
John C. Wheatley, Gregory W. Swift, and Albert Migliori, inventors (to DOE) Filed 4 Oct. 1983 15 p
(Contract W-7405-eng-36)
(DE84-011296; US-Patent-Appl-SN-539013) Avail: NTIS HC A02/MF A01

An apparatus and method for determining acoustic power density level and its direction in a fluid using a single sensor are disclosed. The preferred embodiment of the apparatus, which is termed a thermoacoustic couple, consists of a stack of thin, spaced apart polymeric plates, selected ones of which include multiple bimetallic thermocouple junctions positioned along opposite end edges thereof. The thermocouple junctions are connected in series in the nature of a thermopile, and are arranged so as to be responsive to small temperature differences between the opposite edges of the plates. The magnitude of the temperature difference, as represented by the magnitude of the electrical potential difference generated by the thermopile, is found to be directly related to the level of acoustic power density in the gas. DOE

N84-30896# Sandia Labs., Albuquerque, N. Mex.
PROPAGATION OF ACOUSTIC WAVES IN PARTIALLY SATURATED POROUS MEDIA
R. K. Wilson and E. K. Walsh (Florida Univ., Gainesville) 10 May 1984 14 p refs Presented at the Southeastern Conf. on Theoretical and Appl. Mech., Pine Mountain, Ga., 10 May 1984
(Contract DE-AC04-76DP-00789)
(DE84-010536; SAND-83-1522C; CONF-840504-2) Avail: NTIS

HC A02/MF A01

The propagation of acoustic waves in a partially saturated porous medium is modeled analytically using the continuum theory of mixtures. Three dynamic equations are obtained for the velocities of the liquid, gas and solid phases. The coefficients contain an explicit dependence on the capillary pressure or surface tension. The resulting equations are discussed in the context of previously developed models. DOE

N84-30897# Oak Ridge National Lab., Tenn. Instrumentation and Controls Div.
INVENTION OF A TUNABLE DAMPER FOR USE WITH AN ACOUSTIC WAVEGUIDE IN HOSTILE ENVIRONMENTS
Samuel C. Rogers Jun. 1984 38 p refs
(Contract DE-AC05-84OR-21400)
(DE84-013109; ORNL/TM-9112) Avail: NTIS HC A03/MF A01

A damper was invented to remove undesirable stress pulses from an acoustic waveguide. Designed to be tunable, the damper was constructed to withstand a corrosive or otherwise hostile environment. It serves to simplify the design and enhance the performance of a water-level measurement system, of which the damper and acoustic waveguide are integral parts. An experimental damper was constructed and applied to an existing level probe and measurement system. The resulting damper, properly tuned, causes acoustic stress pulses that pass into it along the waveguide to be attenuated. DOE

N84-30898# National Aerospace Lab., Amsterdam (Netherlands). Flight Mechanics Div.
INSTRUMENTATION FOR IN-FLIGHT ACOUSTIC MEASUREMENTS IN AN ENGINE INTAKE
S. Storm vanLeeuwen and I. Zandbergen 16 Sep. 1983 9 p refs Presented at 2nd AIAA/AHS/IES/SETP/SFTE Flight Testing Conf., Las Vegas, Nev., 16-18 Nov. 1983
(Contract NIVR-1896)
(NLR-MP-83060-U) Avail: NTIS HC A02/MF A01

Acoustic measurements were carried out in the engine intake ducts of the Fokker F28 test aircraft during flight. One of the low bypass ratio engines with a hard walled intake was instrumented to detect the circumferential modes of the sound field. Aerodynamic measurements were carried out to determine the flow conditions in the intake near the wall. In the other engine the impedance of the inlet acoustic liner was measured. An error analysis of the instrumentation is given. It is concluded that the in-flight measurement of acoustic pressure ratios with an accuracy of 4.06% and 2.61 deg., and the measurement of stationary pressure with an accuracy of 0.55% is feasible. Author (ESA)

N84-30899# Chalmers Univ. of Technology, Goteborg (Sweden). Avdelningen foer Byggnadsakustik.
ACTIVE SOUND REDUCTION: A STUDY OF RECENT DEVELOPMENTS AND SOME FUTURE POSSIBILITIES
Elizabeth Lindqvist Nov. 1983 78 p refs
(Grant SWEDCBR-810372-7)
(F83-06; ISSN-0348-288X) Avail: NTIS HC A05/MF A01

It is suggested that active sound reduction is easiest to implement and most effective at low frequencies and in a duct rather than in a room or a free field. The prospects for success are considerably improved if the sound to be attenuated is periodic. Symmetry of the sound field can sometimes be exploited. The physical mechanisms of sound attenuation include reflection of sound by secondary sources, creation of higher order sources in order to reduce the energy radiated and conversion of acoustic energy. Active techniques can also be applied to prevent transmission of sound or vibrations from one sub-field to another. Microelectronics and digital filtering techniques are expected to greatly influence active sound attenuators. Author (ESA)

N84-30863# Joint Publications Research Service, Arlington, Va.
EXCITATION OF SOUND BY LIGHT Abstract Only
F. Kh. Gelmukhanov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 1 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 274, no. 2, Jan. 1984 p 309-311 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N84-30900# Maryland Univ., College Park. Inst. for Physical Science and Technology.
ACCELERATION OF IONS AND ELECTRONS BY WAVE-PARTICLE INTERACTIONS Final Report, 1 Mar. 1982 - 31 Mar. 1984
C. S. Wu and J. D. Gaffey, Jr. 31 Mar. 1984 193 p
(Contract N00014-82-K-0208)
(AD-A142341) Avail: NTIS HC A09/MF A01 CSCL 20/8

The research program is devoted to analyzing the processes responsible for the acceleration of ions and electrons in plasmas, to studying instabilities resulting from energetic ion beams streaming across a magnetic field, or other non-equilibrium features, such as temperature anisotropy or a loss-cone distribution function, and to calculating the spontaneous emission of radiation at the fundamental and harmonics of the cyclotron frequency. The program is divided into six closely related projects. The first and second parts with electromagnetic and electrostatic instabilities resulting from an energetic ion beam streaming across the magnetic field and electron temperature anisotropy in the Earth's bow shock and in magnetic mirrors. The third part treats the acceleration of electrons by plasma turbulence and an field parallel to the magnetic field. The fourth part considers the electron-cyclotron maser instability in a high temperature plasma with a loss-cone distribution function. In the fifth part, the spectral emissivity of spontaneous synchrotron radiation at the fundamental and harmonics of the cyclotron frequency is calculated using the complete relativistic resonance condition. In the sixth part, the stochastic acceleration of ions by a large amplitude ion cyclotron wave is discussed. GRA

N84-30901# New Mexico Univ., Albuquerque. Dept. of Chemistry.
PHOTOIONIZATION INVESTIGATION OF IODINE MOLECULES AND CLUSTERS IN A SUPERSONIC MOLECULAR BEAM Final Report, 15 May 1983 - 14 Feb. 1984
E. A. Walters 30 Apr. 1984 21 p
(Grant AF-AFOSR-0183-83)
(AD-A142645; AFOSR-84-0543TR) Avail: NTIS HC A02/MF A01 CSCL 07/5

A nozzle was designed and constructed which is to produce clusters of iodine molecules in the gas phase. Preliminary tests were conducted. A partial photoion yield curve for the production of iodine molecular ions was obtained for the wavelength region of 1216-1254 A and 1299-1346 A at an optical resolution of 1.75 A. The adiabatic ionization potential of molecular iodine was determined to be 9.309 + or - 0.006 eV with a spin-orbit splitting to the next highest electronic energy state of 0.645 + or - .006 eV. Many autoionization features were observed, but because of the limited range of the wavelength study they were not assigned to Rydberg states. GRA

N84-30902# Fermi National Accelerator Lab., Batavia, Ill.
AUTOMATIC BEAM CENTERING AT THE SSC INTERACTION REGIONS
Hans Joestlein 20 Mar. 1984 5 p
(Contract DE-AC02-76CH-03000)
(DE84-010710; FERMILAB/TM-1253) Avail: NTIS HC A02/MF A01

In the SSC interaction regions, the two colliding beams, each only a few microns in size, have to be centered and maintained in good alignment over many hours, in order to provide the maximum possible luminosity and to minimize off center beam-beam focussing effects. It is unlikely that sufficiently good alignment can be achieved without some kind of active feedback system, based on the beam-beam interaction rate. This memo describes such a system. In the proposed scheme, one of the beams is moved continuously and in a circular fashion about its mean transverse position. The radius of this motion is approximately 0.01 of the rms beam size at the interaction point. The motion is achieved with two sets of crossed high frequency dipole magnets, one on each side of the interaction region, suitably phased. As a consequence of this motion, the beam-beam interaction rate is modulated in synchronism with the beam motion when the beams are not centered on one another. The amplitude and phase of this modulation yields information on the magnitude and direction of the misalignment between the beams, allowing continuous display and automatic correction of any misalignments. DOE

N84-30903# Indiana Univ., Bloomington. Dept. of Physics.
INDIANA UNIVERSITY THEORETICAL PARTICLE PHYSICS GROUP Final Report, 1 Dec. 1970 - 31 Oct. 1983
A. W. Hendry, D. B. Lichtenberg, and D. H. Weingarten 1983 23 p refs
(Contract DE-AC02-76ER-02009)
(DE84-010593; DOE/ER-02009/148; COO-2009-148) Avail: NTIS HC A02/MF A01

A broad program of research to understand aspects of the interactions of nature on both theoretical and phenomenological levels was carried out. The research has led to the publication of about 130 papers; these paper are listed. By working closely with the members of the high energy experimental group theoretical support and help in interpretation of their experiments were given. A brief summary of accomplishments is given. DOE

N84-30904# Oak Ridge National Lab., Tenn.
INTRODUCTION TO NEUTRON SCATTERING BY MAGNETIC EXCITATIONS
H. A. Mook Mar. 1984 21 p refs Presented at Workshop on High Energy Excitations in Condensed Matter, Los Alamos, N. Mex., 13 Feb. 1984
(Contract DE-AC05-84OR-21400)
(DE84-008579; CONF-840264-4) Avail: NTIS HC A02/MF A01

There are a wide variety of magnetic phenomena and measurements which provide a test of the many-body theories that are necessary to understand condensed matter physics of all types. Indeed the famous theorem quoted by Van Vleck as Miss van Leewen's theorem tells us that classical statistics applied to any metallic system results in no magnetism so that quantum mechanics is necessary to even get started. The magnetic moment of neutrons makes them an excellent probe of magnetic phenomena and very direct information is obtainable with neutrons. In fact the generalized susceptibility is directly given by a neutron scattering experiment, and this quantity tells all there is to know about a magnetic system. Neutron scattering formalism is established so that it will not have to be repeated by each author. Various types of magnetic systems are briefly discussed. DOE

N84-30905# Brookhaven National Lab., Upton, N. Y.
NUCLEAR AND PARTICLE PHYSICS ASPECTS OF HYPERON AND ANTINUCLEON INTERACTIONS
C. B. Dover 1984 14 p refs Presented at Intern. Symp. on Nucl. Spectry. and Nucl. Interactions, Osaka, 21 Mar. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010793; BNL-34569; CONF-8403112-1) Avail: NTIS HC A02/MF A01

A discussion is given of hyperon (Y) and antinucleon (anti N) interactions with nucleons and nuclei, emphasizing some of the future prospects for nuclear structure and elementary particle physics studies at LEAR or a future kaon factory. The topics addressed include: (1) production and decay of strange dibaryons; (2) spectroscopy of strangeness S = -2 many body systems; (3) N anti N annihilation mechanisms; and (4) inelastic anti N nucleus scattering and spin flip excitations in nuclei. DOE

N84-30906# Argonne National Lab., Ill. Physics Div.
HIGH-CURRENT, LOW-ENERGY SYNCHROTRONS AND COMPRESSOR RINGS
R. L. Kustom 1 May 1984 9 p refs Presented at 10th Intern. Conf. on Cyclotrons and their Appl., East Lansing, Mich., 30 Apr. 1984
(Contract W-31-109-eng-38)
(DE84-012104; CONF-8404143-2) Avail: NTIS HC A02/MF A01

The primary application of high current, low energy synchrotrons and linac compressor rings is as proton drivers for pulsed-spallation neutron sources. They operate in the range of 500 to 1500 MeV with extracted beam repetition rates between 12 to 100 Hz. The time-averaged currents on target are a few tens of microamperes today, soon will be a few thousand in the future. The characteristics for the accelerators and compressor rings, their limitations, and existing and proposed major facilities are described. DOE

N84-30907# Stanford Linear Accelerator Center, Calif.
MAKING ELECTRON BEAMS FOR SLC LINAC
J. E. Clendenin, S. D. Ecklund, M. B. James, R. H. Miller, J. C. Sheppard, J. Sodja, J. B. Truher, and A. Minten (European Organization for Nuclear Research, Geneva) Jan. 1984 3 p refs Presented at Linear Accelerator Conf., Darmstadt-Seeheim, West Germany, 7 May 1984
(Contract DE-AC03-76SF-00515)
(DE84-012072; SU-SLAC-Pub-3285; Conf-840529-30) Avail: NTIS HC A02/MF A01

A source of high-intensity, single-bunch electron beams was developed at SLAC for the SLC. The properties of these beams were studied extensively utilizing the first 100-m of the SLAC linac and the computer-based control system being developed for the SLC. The source is described and the properties of the beams are summarized. DOE

N84-30908# Argonne National Lab., Ill.
COMPARISON OF SOME SSC BEAM PARAMETERS FOR pp AND ANTI pp
R. Diebold 12 Mar. 1984 10 p Presented at a Workshop on Anti pp Options for the SSC, Chicago, 13-17 Feb. 1984
(Contract W-31-109-eng-38)
(DE84-010729; ANL-HEP-CP-84-09; CONF-840275-4) Avail: NTIS HC A02/MF A01

Based on discussions at the Ann Arbor workshop and early work on the Reference Designs Study, typical parameters for a pp SSC are presented and compared with anti p anti p parameters similar to those presented. This comparison is summarized in the table. DOE

N84-30909# California Univ., Livermore. Lawrence Livermore Lab.
OBSERVED CURRENT ENHANCEMENT WITH PROPAGATION OF THE ETA ELECTRON BEAM IN AIR
John C. Clark, Kenneth W. Struve, Simon S. Yu, and Ralph E. Melendez 3 Apr. 1984 16 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12-14 Sep. 1983
(Contract W-7405-eng-48)
(DE84-010558; UCRL-88924; CONF-830911-39) Avail: NTIS HC A02/MF A01

With the ETA electron beam propagating in air the net current exceeds the beam current for pressures between 20 and 500 Torr. Microwave measurements indicate this current enhancement is distinctly different than that associated with the two-stream instability at low pressure. Detailed measurements of its dependence on pressre, current, beam size, and propagation distance are given. A theory is proposed that attributes the additional forward current to energetic secondary electrons pushed forward by the beam self-magnetic field. Detailed comparison of measurements with the results of a non-local Boltzmann code are made. DOE

N84-30910# Los Alamos Scientific Lab., N. Mex.
ELECTRON MOTION IN SOLENOIDAL MAGNETIC FIELDS USING A FIRST ORDER SYMPLECTRIC INTEGRATION ALGORITHM
J. S. Fraser 7 May 1984 4 p refs Presented at Linear Accelerator Conf., Darmstadt-Seeheim, West Germany, 7 May 1984

(Contract W-7405-eng-48)
(DE84-011341; LA-UR-84-1307) Avail: NTIS HC A02/MF A01

The use of nonsymplectic procedures in particle tracing codes for relativistic electrons leads to errors that can be reduced only at the expense of using very small integration steps. More accurate results are obtained with symplectic transformations for position and momentum. A first order symplectic integration procedure requires an iterative calculation of the new position coordinates using the old moments, but the process usually converges in three or four steps. A first order symplectic algorithm was coded for cylindrical as well as cartesian coordinates using the relativistic equations of motion with Hamiltonian variables. The procedure is applied to the steering of a beam of 80 keV electrons by a weak transverse magnetic field superposed on a strong magnetic field in the axial direction. The steering motion is shown to be parallel to the transverse field rather than perpendicular as would be the case without the strong axial field. DOE

N84-30911# Los Alamos Scientific Lab., N. Mex.
NEW DIRECTIONS IN LINEAR ACCELERATORS
R. A. Jameson 1984 7 p refs Presented at Linear Accelerator Conf., Darmstadt-Seeheim, West Germany, 7 May 1984
(Contract W-7405-eng-36)
(DE84-011412; LA-UR-84-1359) Avail: NTIS HC A02/MF A01

Current work on linear particle accelerators is placed in historical and physics contexts, and applications driving the state of the art are discussed. Future needs and the ways they may force development are outlined in terms of research and development challenges presented to accelerator designers. DOE

N84-30912# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
A HIGH CURRENT HEAVY ION BEAM TRANSPORT EXPERIMENT AT LBL
W. Chupp, A. Faltens, E. C. Hartwig, D. Keefe, C. H. Kim, C. Pike, S. S. Rosenblum, M. Tiefenback, D. Vanecek, and A. I. Warwick Jan. 1984 13 p refs Presented at the INS Intern. Symp. on Heavy Ion Accelerators and their Appl. to Inertial Fusion, Tokyo, 23-27 Jan. 1984
(Contract DE-AC03-76SF-00098)
(DE84-009225; LBL-17256; CONF-840142-5) Avail: NTIS HC A02/MF A01

Information on the current limit in a long quadrupole transport channel is required in designing an accelerator driver for an inertial confinement fusion system. Although a current transport limit was proposed, quantitative estimates require a detailed knowledge of the stability of the beam. Analytic calculations based on the Kapchinskij-Vladimirskij (K/V) distribution function identify transversely unstable modes, but particle simulations show that some of the K/V instabilities are benign, i.e., particles redistribute themselves in the 4-D transverse phase space, but the rms emittances do not grow. Some preliminary results of beam transport experiments are reported. DOE

N84-30913# School of Aerospace Medicine, Brooks AFB, Tex.
ELEMENTARY PRINCIPLES OF LINEAR ACCELERATORS
G. A. Loew and R. Talman Sep. 1983 46 p refs Presented at SLAC Summer School on High-Energy Particle Accelerators, Stanford, Calif., 2 Aug. 1982
(Contract DE-AC03-76SF-00515)
(DE84-007911; SLAC-Pub-3221) Avail: NTIS HC A03/MF A01

A short chronology of important milestones in the field of linear accelerators is presented. Proton linacs are first discussed and elementary concepts such as transit time, shunt impedance, and Q are introduced. Critical issues such as phase stability and transverse forces are addressed. An elementary discussion of waveguide acclerating structures is also provided. Finally, electron accelerators addressed. Taking SLAC as an exmple, various topics are discussed such as structure design, choice of parameters, frequency optmization, beam current, emittance, bunch length and beam loading. Recent developments and future challenges are mentioned briefly. DOE

N84-30914# Institute of Electrical and Electronics Engineers, New York, N.Y.
IEEE TRANSACTIONS ON NUCLEAR SCIENCE. VOLUME NS-30, NO. 4, PART 2: 1983 PARTICLE ACCELERATOR CONFERENCE
R. F. Shea, ed. Aug. 1983 833 p refs Conf. held in Santa Fe, N. Mex., 21-23 Mar. 1983; sponsored by DOE, DARPA, NSF and American Physical Society 2 Vol.
(Contract DE-FG02-83ER-40088)
(DE84-007400; DOE/ER-40088/1-Pt-2; CONF-830311-Pt-2) Avail: NTIS HC A99/MF A01

This second part of the conference proceedings on particle accelerators completes the two part set. Abstracts of individual items from the conference were prepared separately for the data base. Topics include: reactor technology, particle accelerators, cryogenics, superconductors, spin dynamics and plasma physics. B.G.

N84-30915# Brookhaven National Lab., Upton, N. Y.
HYPERNUCLEAR RESEARCH AT THE AGS
Robert E. Chrien 1984 32 p refs Presented at the Intern. Symp. on Nucl. Spectry. and Nucl. Interactions, Osaka, 21 Mar. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010282; BNL-34582; CONF-8403112-2) Avail: NTIS HC A03/MF A01

Although the field of hypernuclear research is over 30 years old, progress in exploring the detailed behavior of hypernuclei was slow. This fact is due mainly to the technical problems of producing and studying these strange objects. Indeed each step in the improvement of technique was accompanied by a breakthrough in the understanding of this fascinating subject. The aim is to describe the evolution of hypernuclear research, stressing especially the contributions of the program based on the Brookhaven AGS. DOE

N84-30916# Department of Energy, Washington, D. C.
X-RAY BEAM FINDER Patent Application
Hubert W. Gilbert, inventor (to DOE) Filed 16 Jun. 1983 13 p
(Contract DE-AC04-76DP-00789)
(DE84-011100; US-Patent-Appl-SN-504905) Avail: NTIS HC A02/MF A01

An X-ray beam finder for locating a focal spot of an X-ray tube was described. The beam finder includes a mass of X-ray opaque material having first and second axially aligned, parallel opposed faces connected by a plurality of substantially identical parallel holes perpendicular to the faces and a film holder for holding X-ray sensitive film tightly against one face while the other face is placed in contact with the window of an X-ray head. DOE

N84-30917# Argonne National Lab., Ill.
PHOTOELECTRON STUDIES OF EXCITED MOLECULAR STATES: H2 C (1)PI(SUB U) AND N2 o3 (1)PI(SUB U)
J. L. Dehmer, P. M. Dehmer, and S. T. Pratt 1984 6 p refs Presented at 13th Intern. Quantum Electron. Conf., Anaheim, Calif., 18 Jun. 1984
(Contract W-31-109-eng-38)
(DE84-006663; CONF-840629-1) Avail: NTIS HC A02/MF A01

Resonantly enhanced multiphoton ionization (REMPI)affords the opportunity to select a specific ionization pathway in order to produce a particular ionic state for further study (such as state-selected ion-molecule reactions) or to investigate detailed aspects of excited state photoionization dynamics. The production of electronic and vibrational state-selected ions was achieved, and in some instances rotational state-selection may be possible. State-selected ions are obtained by first preparing an intermediate Rydberg state that has a potential energy curve similar to that of the desired final ionic state, and then ionizing the Rydberg state with a single additional photon. Under these circumstances, the Franck-Condon factors governing the final ionization step strongly favor the preservation of the vibrational level of the Rydberg state core. In addition, the photoionizing transition is expected to favor the further excitation of the Rydberg electron, while retaining the electronic state of the ion core. DOE

N84-30918# Department of Energy, Washington, D. C.
METHOD AND SOURCE FOR PRODUCING A HIGH CONCENTRATION OF POSITIVELY CHARGED MOLECULAR HYDROGEN OR DEUTERIUM IONS Patent Application
Kenneth W. Ehlers and Ka-Ngo Leung, inventors (to DOE) Filed 26 Jul. 1983 22 p
(Contract DE-AC03-76SF-00098)
(DE84-011030; US-Patent-Appl-SN-517476) Avail: NTIS HC A02/MF A01

A high concentration of positive ion source having a short path length of extracted ions, relative to the mean free path of the gas molecules, to minimize the production of other ion species by collision between the positive ions and gas molecules. The ion source has arrays of permanent magnets to produce a multicusp magnetic field in regions remote from the plasma grid and the electron emitters, for largely confining the plasma to the space there between. The ion source has a chamber which is short in length, relative to its transverse dimensions, and the electron emitters are at even shorter distance from the plasma grid, which contains one or more extraction apertures. Author

N84-30919# National Science Foundation, Washington, D.C.
REACTIVE RESONANCE AND ANGULAR DISTRIBUTIONS IN THE ROTATING LINEAR MODEL
Edward F. Hayes and Robert B. Walker (Los Alamos National Lab.) 1984 44 p refs Presented at the 187th Natl. Meeting of the American Chemical Society, St. Louis, 9-12 Apr. 1984
(Contract W-7405-eng-36)
(DE84-011354; LA-UR-84-1235; CONF-840415-20) Avail: NTIS HC A03/MF A01

The way in which resonances in reactive scattering affect the angular distribution of the products of reaction is described. A simple 3D model of reactions, the Bend-Corrected Rotating Linear Model was employed, and angular distributions were computed for several reactive systems in which resonances contribute to the scattering dynamics. The eactions studied were F + H2 (YIELDS) HF + He + H2(+) (YIELDS) HeH(+) + H. DOE

N84-30920# Los Alamos Scientific Lab., N. Mex.
RFQ RADIAL MATCHING SECTIONS AND FRINGE FIELDS
K. R. Crandall 1984 4 p refs Presented at the 1984 Linear Accelerator Conf., Darmstadt, West Germany, 7-11 May 1984
(Contract W-7405-eng-36)
(DE84-011408; LA-UR-84-1281; CONF-840529-23) Avail: NTIS HC A02/MF A01

The entrance radial matching section is an extremely important part of any radio frequency quadrupole (RFQ) linac. It allows a beam having time independent characteristics to become adapted to the time dependent focussing in the RFQ. The matching sections proposed are defined by a four term potential function and are very effective over lengths of 3 (BETA) lambda or longer. The fringe field at the RFQ exit is mainly of interest because of the time varying on axis potential. The beam can either lose or gain energy, depending on the shape of the fringe field. The same four term potential function can be used for shaping the vanes at the exit so that the fringe fields can be controlled. This formulation also applies to exit radial matching sections, which would be useful if the beam is to enter another RFQ operated at a higher frequency. M.A.C.

N84-30921# California Univ., Livermore. Lawrence Livermore Lab.
CALCULATION OF MOLECULAR FINAL STATES AND THEIR EFFECT ON A PRECISION NEUTRINO MASS EXPERIMENT
O. Fackler (Rockefeller Univ., N.Y.), M. Mugge (Fermi National Accelerator Lab., Batavia, Ill.), H. Sticker (Rockefeller Univ., N.Y.), N. Winter, and R. Woerner Feb. 1984 9 p Presented at the 4th Moriond Workshop on Massive Neutrinos in Particle and Astro-Phys., La Plagne, France, 15-21 Jan. 1984
(Contract W-7405-eng-48)
(DE84-011071; UCRL-90687; CONF-840150-4) Avail: NTIS HC A02/MF A01

An experiment to determine the electron neutrino mass is performed with the precision of a few electron volts by measuring the tritium beta decay energy distribution near the endpoint. At the few electron volt level, a major consideration in the choice of a tritium source is the effect of excited final atomic or molecular states on the beta decay distribution. It is important to choose a source for which the initial and final states are accurately calculated. Frozen tritium was chosen as the source since the states of molecular tritium and those of the HeT(+) daughter ion have electronic wavefunctions that are calculated with high accuracy. The effects of final excited states on the neutrino mass determination and the results of these calculations are described. DOE

N84-30922# State Univ. of New York, Stony Brook. Dept. of Chemistry.
MULTIPHOTON IONIZATION SPECTROSCOPY AND PHOTOCHEMISTRY OF TRANSIENT SPECIES Technical Progress Report
Philip M. Johnson Mar. 1984 9 p
(Contract DE-AC02-80ER-10660)
(DE84-010424; DOE/ER-10660/T2) Avail: NTIS HC A02/MF A01

A technique is developed for the production of cold triplets and radicals in sufficient densities to allow multiphoton ionization and other types of skimmed beam experiments using pulsed valves. The occurrence of the discharge outside the valve permits the production of species which are sensitive to collisional quenching because soon after production the expansion eliminates further interaction of reactive species. The crux of the technique lies in the development of a suitable pulsed electric discharge. Some of the problems overcome in the development of this technique include arcing between the electrodes and jitter in the onset of the discharge. Triplet argon, triplet CO and CCL radical, are used to demonstrate this technique. DOE

N84-30923# Brookhaven National Lab., Upton, N. Y. Dept. of Physics.
MONTE CARLO SIMULATION OF THE MICROCANONICAL ENSEMBLE
Michael Creutz 5 Apr. 1984 12 p refs Presented at a Workshop on Gauge Theory on Lattice, Argonne, Ill., 5-7 Apr. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010880; BNL-34641; CONF-8404119-1) Avail: NTIS HC A02/MF A01

Simulating statistical systems with a random walk on a constant energy surface is considered. This combines features of deterministic molecular dynamics techniques and conventional Monte Carlo simulations. For discrete systems the method is programmed to run an order of magnitude faster than other approaches. It does not require high quality random numbers and may also be useful for nonequilibrium studies. DOE

N84-30924# Stanford Linear Accelerator Center, Calif.
TEMPERATURE RISE CALCULATIONS FOR THE BEAM PIPE IN THE SLC ARCS
W. R. Nelson and T. M. Jenkins 7 Jul. 1983 8 p refs
(Contract DE-AC03-76SF-00515)
(DE84-011764; SU-SLAC-CN-235) Avail: NTIS HC A02/MF A01

This note presents the results of EGS calculations for 50 GeV electron beams showering in 1mm thick slabs of copper and aluminum at glancing angles. The maximum temperature rise for 50 micron (Gaussian sigma) beams of 5 x 10(10)e(-)/pulse was found to increase with angle, ranging about: 300 to 700(0)C/pulse (copper), and 50 to 100(0)C/pulse (aluminum) for angles of incidence between 0.1 to 10 mradians. The results are also applicable to slabs thicker than 1mm within this angular range. For larger angles, where shower leakage out the back becomes important, the slabs were made thicker. These extended results (see last figure) are applicable for all angles of incidence and should be useful for calculating the maximum temperature rise in such devices as collimators and slits. DOE

N84-30925# Argonne National Lab., Ill.
PHOTOIONIZATION OF EXCITED MOLECULAR STATES USING MULTIPHOTON EXCITATION TECHNIQUES
P. M. Dehmer, S. T. Pratt, and J. L. Dehmer 1984 3 p Presented at the Spring Meeting of the Electrochemical Society, Cincinnati, 6 May 1984
(Contract W-31-109-eng-38)
(DE84-004034; CONF-840555-3) Avail: NTIS HC A02/MF A01

Resonantly enhanced multiphoton ionization (REMPI) affords the opportunity to select a specific ionization pathway in order to produce a particular ionic state for further study or to investigate detailed aspects of excited state photoionization dynamics. The production of electronic or vibrational state-selected ions using REMPI is achieved by first preparing an intermediate Rydberg state that has a potential energy curve similar to that of the final desired ionic state, and then ionizing the Rydberg state with a single additional photon. Under these circumstances, the Franck-Condon factors governigg the final ionization step strongly favor the preservation of the Rydberg state core. DOE

N84-30926# Maryland Univ., College Park. Dept. of Physics and Astronomy.
NEW APPROACH TO POLARIZED PROTON SCATTERING BASED ON DIRAC DYNAMICS
Stephen J. Wallace 1983 47 p refs Presented at the Los Alamos Meson Physics Facility Users Group Meeting, Los Alamos, N. Mex., 7-8 Nov. 1983
(Contract DE-AS05-76ER-05126)
(DE84-008018; DOE/ER-05126/207; CONF-8311144-1; ORO-5126-207) Avail: NTIS HC A03/MF A01

The Dirac impulse approximation has to date provided dramatic improvement in the ability to predict, with no free parameters, spin observables in proton-cleus elastic scattering at intermediate energies. The key ingredients of this approach are Dirac propagation and the nucleon-nucleon invariant amplitudes. So far, local approximations to the NN amplitudes were used. The standard NN representation in terms of Dirac scalar, vector, and so on, parts which is free of kinematical singularities seems to naturally predict the correct coupling to negative energy states for energies above 300 MeV. At low energy, this coupling is subject to an ambiguity between pseudoscalar and pseudovector (PI)N coupling mechanisms and it is evident that the pseudoscalar coupling treated in a local approximation causes too much scalar-vector difference and thus too large pair contributions. Once this problem is remedied, the Dirac optical potential is expected to be calculable from a nucleon-nucleon quasi-potential over the range 0 to 1000 MeV. DOE

N84-30927# Los Alamos Scientific Lab., N. Mex.
PION ELASTIC AND INELASTIC SCATTERING FROM (40) (42) (44) (48)Ca AND (54)Fe Thesis
Kenneth Gary Boyer Feb. 1984 402 p refs
(Contract W-7405-eng-36)
(DE84-009080; LA-9974-T) Avail: NTIS HC A18/MF A01

Differential cross sections were measured for pion elastic and inelastic scattering from (40) (42) (44) (48)Ca and (54)Fe at T/sub (PI)/ = 116.0, 180.0, and 292.5 MeV. The ground states were analyzed using a Kisslinger potential with and without free parameters. The low-lying collective states were analyzed using a distorted wave impulse approximation with no free parameters and transition densities obtained from electron and proton scattering data. These analyses adequately reproduced the pion scattering data. Ground-state neutron density rms radii were estimated and compared with a theoretical calculation and analyses of proton, alpha, pion, and pionic X-ray data. Proton and neutron multipole matrix elements were extracted from the 21(+) and 31(-) states in (42) (44) (48)Ca and compared with tabulated electromagnetic matrix elements. Model-dependent errors are examined by comparing the results of calculations using collective-model form factors with those using form factors fitted to electron and proton scattering data. DOE

N84-30928# Brookhaven National Lab., Upton, N. Y.
ACCELERATOR-BASED ATOMIC PHYSICS EXPERIMENTS WITH PHOTON AND ION BEAMS
B. M. Johnson, K. W. Jones, and M. Meron 26 Apr. 1984 3 p refs Presented at the DOE/SES Atomic Phys. Program Contractors Workshop, Gaithersburg, Md., 26-27 Apr. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010789; BNL-34477; CONF-840481-5) Avail: NTIS HC A02/MF A01

Accelerator-based atomic physics experiments at Brookhaven presently use heavy-ion beams from the Dual MP Tandem Van de Graaff Accelerator Facility for atomic physics experiments of several types. Work is presently in progress to develop experiments which will use the intense photon beams which will be available in the near future from the ultraviolet (UV) and X-ray rings of the National Synchrotron Light Source (NSLS). Plans are described for experiments at the NSLS and an exciting development in instrumentation for heavy-ion experiments is summarized. DOE

N84-30929# California Univ., Berkeley. Lawrence Berkeley Lab.
HIGH-SPIN GAMMA-RAY SPECTROSCOPY
R. M. Diamond Mar. 1984 19 p refs Presented at Intern. Symp. on Nucl. Spectry. and Nucl. Interactions, Osaka, 21 Mar. 1984
(Contract DE-AC03-76SF-00098)
(DE84-010716; LBL-17575; CONF-8403112-3) Avail: NTIS HC A02/MF A01

Nuclei can carry angular momentum by single-particle alignments and by collective motion, as was well illustrated in discrete-line spectroscopy. From continuum (GAMMA)-ray studies in still higher spin regions, it appears that these modes both continue. In favorable cases in rare-earth nuclei, particle alignments from the valence shell separate from proton alignments from the next higher shell. A new generation of Compton-suppressed Ge detector arrays will greatly enhance high-spin studies, both continuum and discrete-line. DOE

N84-30930# California Univ., Berkeley. Lawrence Berkeley Lab.
DETERMINATION OF ENERGETICS AND SPECTRA OF SIMPLE MOLECULAR SYSTEMS USING THEORETICAL METHODS Thesis
G. P. Raine Oct. 1983 94 p refs
(Contract DE-AC03-76SF-00098; Grant NSF CHE-82-18785)
(DE84-009668; LBL-17306) Avail: NTIS HC A05/MF A01

Ab initio molecular orbital theory was used to evaluate several chemical systems. The applicability of the current standard models was explored. Within the Hartree-Fock self consistent field (SCF) and configuration interaction (CI) approaches, the nonrelativistic Schroedinger equation was used to determine energetic stability of the dimers of carbon monoxide and carbon monosulfide. For these systems the harmonic vibrational frequencies were predicted and the nature of the chemical bond in the dimers was explored. Application of the Breit-Pauli Hamiltonian, including only those terms important to small systems, within an SCF and CI treatment was these effects on the methylene molecule is given, with particular focus on the singlet triplet excitation energy. Focusing on vibrational frequencies, anharmonic effects were included using the Darling-Dennison-Watson Hamiltonian. Using a variational treatment, frequencies were predicted for the molecular ion, O2H(+), at the SCF and CI levels of theory using double zeta (DZ) and double zeta plus polarization (DZP) basis set. DOE

N84-30931# Argonne National Lab., Ill. Fusion Power Program.
MODELING THE INTERACTION OF HIGH POWER ION OR ELECTRON BEAMS WITH SOLID TARGET MATERIALS
A. M. Hassanein Nov. 1983 26 p refs
(Contract W-31-109-eng-38)
(DE84-009126; ANL/FPP/TM-179) Avail: NTIS HC A03/MF A01

Intense energy deposition on first wall materials and other components as a result of plasma disruptions in magnetic fusion devices are expected to cause melting and vaporization of these materials. The exact amount of vaporization losses and melt layer thickness are very important to fusion reactor design and lifetime. Experiments using ion or electron beams to simulate the disruption effects have different environments than the actual disruption conditions in fusion reactors. A model was developed to accurately simulate the beam target interactions so that the results from such experiments are meaningful and useful to reactor design. This model includes a two dimensional solution of the heat conduction equation with moving boundaries. The vaporization and melting of the sample strongly depends on the characteristics of the beam spatial distribution, beam diameter, and on the power time variation of the beam. DOE

N84-30932# California Univ., Livermore. Lawrence Livermore Lab. .
IMPURITY CHARACTERISTICS OF TMX-U
S. L. Allen, T. L. Yu, and T. J. Nash 1 May 1984 38 p refs
(Contract W-7405-eng-48)
(DE84-012413; UCID-20026) Avail: NTIS HC A03/MF A01

A study of the concentrations, radiated power, and sources of impurities in the TMX-U plasma is presented. Three extreme ultraviolet (EUV) instruments were used: one monochromator that measures time-resolved radial profiles of a particular impurity line, and two time-resolving spectrographs that measure the time histories of several impurity lines in a single shot. The major impurities found in the TMX-U plasma are carbon, nitrogen, and oxygen. Titanium and silicon are also observed. The impurity concentrations are low, less than 1% and the radiated power is a small fraction of the input power. The major source of oxygen and nitrogen is the neutral beam injector. Wall conditioning, such as glow discharge cleaning and titanium gettering, decreases the impurity concentrations, particularly carbon. There does not seem to be an accumulation of impurities in the thermal barrier region under the present plasma conditions. Future experiments are discussed. DOE

N84-30933# Texas Univ., Austin. Dept. of Physics.
RESEARCH PROGRAM IN ELEMENTARY PARTICLE THEORY Progress Report
E. C. G. Sudarshan and D. A. Dicus Apr. 1984 79 p
(Contract DE-AS05-76ER-03992)
(DE84-011502; DOE/ER-03992/552) Avail: NTIS HC A05/MF A01

Research progress is reported on the following topics: gauge theory and monopole physics; supersymmetry and proton decay; strong interactions and model of particles; quantum rotator and spectrum generating group models of particles; geometric foundations of particle physics and optics; and application of particle physics to astrophysics. The titles of DOE reports are listed, and research histories of the scientific staff of the Center for Particle Theory are included. DOE

N84-30934# Language Services, Knoxville, Tenn.
CALCULATION OF BALLISTIC FOCUSING OF ION BEAMS
V. T. Astrelin and E. M. Syresin 1984 21 p refs Transl. into ENGLISH of Preprint no. 83-41, Inst. of Nuclear Physics, Academy of Sciences (USSR), Novosibirsk 24 p
(Contract DE-AC05-84OR-21400)
(DE84-012870; ORNL-TR-5118) Avail: NTIS HC A02/MF A01

The motion of ions passing from the homogeneous magnetic field into a conical one is treated analytically in paraxial approximation. Further ions transform into neutral particles at the recharging target which is placed in the conical area of field. The optimal conditions for maximum compression of the beams of neutral particles are investigated. An influence of the initial angular spread on the beam compression is analysed. The computation results together with the those of analytical treatment are presented. DOE

N84-30935# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
MEASUREMENTS OF INTEGRAL STATE-SPECIFIC CROSS SECTIONS OF INELASTIC COLLISIONS BETWEEN NO AND NOBLE GASES Thesis [MESSUNGEN INTEGRALER ZUSTANDSSPEZIFISCHER QUERSCHNITTE BEI INELASTISCHEN NO-EDELGAS-STOESSEN]
H. Joswig Dec. 1983 105 p refs In GERMAN
(MPIS-18/1983; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,60

An experiment to measure the integral inelastic cross sections of collisions between NO and noble gases with crossed pulsed molecular beams and the state-selective using laser induced fluorescence determination is described. Measurements of the rotational excitation show a structure predicted in semiclassical calculations. Approximate calculations treating NO without internal structure show good qualitative agreement with experimental results. Quantitative agreement is only obtained if the electronic structure of the NO molecule is taken into account. The cross sections for the electronically inelastic transitions are different from these for the energy transfer within the electronically elastic state. Author (ESA)

N84-30936# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
SCATTERING EXPERIMENTS ON ROTATIONAL EXCITATION OF METHANE IN COLLISION WITH NOBLE GASES Thesis [STREUEXPERIMENTE ZUR ROTATIONSANREGUNG VON METHAN IM STOSS MIT EDELGASEN]
A. Kohlhase Feb. 1984 107 p refs In GERMAN
(MPIS-3/1984; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,90

The interaction between methane and neon, helium and argon was investigated in an experiment with crossed molecular beams. The energy loss and angular distributions were measured at energies between 75 and 95 meV. The collision systems Ne-CH4 and At-CH4 show, in contrast with He-CH4, for small angles, high inelastic transition probability due to rotational excitation. The position of maximum transfer in the energy loss spectra for medium deviation angles lies at higher rotational end states than for small and large angles. The structure of spectra, the contribution of single radial potential and the different effects of A-and T-symmetry configurations of CH4 are explained by an analysis of the system Ne-CH4 using coupled-states calculations in which a Hartree-Fock dispersion potential is applied. Isotropic and anisotropic interaction potentials are determined for the systems Ne-CH4 and He-CH4. A more accurate value of a known interaction potential for Ar-CH4 is obtained. Author (ESA)

N84-30937# Rome Univ. (Italy). Dept. of Physics.
STAGGERED FERMIONS AND ROTATION-GAUGE INVARIANCE
Giorgio Parisi and Zhang Yi-Cheng (SISSA, Trieste) 12 Jul. 1983 20 p refs Submitted for publication
(Preprint-357) Avail: NTIS HC A02/MF A01

The rotational invariance of the staggered fermions on the lattice are studied, by considering them as spin zero fields in a quenched gauge field background. The noninteger spin fermionic fields are reconstructed. Bilinear operators (i.e., meson fields) in terms of the quark fields on a cube are classified according to the representations of the discrete rotational group. Author (ESA)

N84-30938# Rome Univ. (Italy). Inst. of Physics.
SOME NEGATIVE RESULTS FOR AVOIDING LATTICE FERMIONIC DOUBLING
Giorgio Parisi and Zhang Yi-Cheng (SISSA, Trieste) 12 Jul. 1983 7 p refs Submitted for publication
(Preprint-358) Avail: NTIS HC A02/MF A01

It is shown that it is impossible to solve the lattice fermion doubling problem via random fields in the perturbative framework. Author (ESA)

N84-30939# Dortmund Univ. (West Germany). Inst. fuer Physik.
WEAK CORRECTIONS TO THE e+e-YIELDS MU+MU- ASYMMETRY
R. W. Brown (Case Western Reserve Univ.), R. Decker, and E. A. Paschos Jul. 1983 5 p refs
(DO-TH-83-16; CWRUTH-83-7) Avail: NTIS HC A02/MF A01

A study of the weak corrections to the e+e- yields mu+mucharge asymmetry reveals a sizable effect from the Z-boson self energy. All other weak corrections are negligible at present energies. A compact formula for the gamma Z box diagram is also presented. Author (ESA)

N84-30940# Stockholm Univ. (Sweden). Inst. of Physics.
FLAVOR MIXING AND THE SIX QUARK MODEL
C. Jarlskog May 1984 13 p refs
(USIP-84-08) Avail: NTIS HC A02/MF A01

The status of quark mixing is reviewed. The determination of the parameters of the Kobayashi-Maskawa matrix and the Wolfenstein matrix are discussed. The observed family-mixing pattern is extrapolated to a hypothetical fourth family. The most optimistic possibility for having long-lived very heavy flavor is discussed. Author (ESA)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N84-30941# Battelle Columbus Labs., Ohio.
SOME SCOPING EXPERIMENTS FOR A SPACE REACTOR
C. A. Alexander and J. S. Ogden 7 Jul. 1983 27 p refs
(Contract W-7405-eng-92)
(DE84-009101; DOE/NBM-4009101) Avail: NTIS HC A03/MF A01

Some scoping experiments were performed to evaluate fuel performance in a lithium heat pipe reactor operating at a nominal 1500K heat pipe temperature. Fuel-coolant and fuel-coolant-clad relationships showed that once a failed heat pipe occurs temperatures can rise high enough so that large concentrations of uranium is transported by the vapor phase. Upon condensation this uranium would be capable of penetrating heat pipes adjacent to the failed pipe. The potential for propagation of failure exists with UO2 and a lithium heat pipe. Changing the composition of the metal of the heat pipe would have only a second order effect on the kinetics of the failure mechanism. Uranium carbide and nitride were considered as potential fuels which are nonreactive in a lithium environment. At high temperatures the nitride would be favored because of its better compability with potential cladding materials. Compositions of UN with small additions of YN appear to offer very attractive properties for a compact high temperature high power density reactor. DOE

N84-30942# Department of Energy, Washington, D. C.
TRANSVERSE FIELD FOCUSED SYSTEM Patent Application
Oscar A. Anderson, inventor (to DOE) Filed 1 Jun. 1983 18 p
(Contract DE-AC03-76SF-00098)
(DE84-011070; US-Patent-Appl-SN-500105) Avail: NTIS HC A02/MF A01

A transport apparatus for a high current negative-ion beam which bends the beam around corners through a baffled path in a differential pump or a neutron trap is provided. A transport apparatus for a high current negative-ion beam which allows gas molecules in the beam to exit outwardly from the transport apparatus is provided. A multi-stage accelerator for a high current negative-ion beam which enables acceleration of the beam to very high energy levels with a minimum loss of current carrying capacity is provided. An apparatus for transport or acceleration of a sheet beam of negative ions which is shaped to confine the beam against divergence or expansion is also provided. DOE

N84-30943# Los Alamos Scientific Lab., N. Mex.
SPACE NUCLEAR SAFETY PROGRAM Progress Report, Oct. 1983
S. E. Bronisz, comp. Mar. 1984 15 p
(Contract W-7405-eng-36)
(DE84-011015; LA-10057-PR) Avail: NTIS HC A02/MF A01

This technical monthly report covers studies related to the use of Pu(238)O2 in radioisotope power systems carried out for the Office of Special Nuclear Projects of the US Department of Energy by Los Alamos National Laboratory. DOE

N84-30944# Oak Ridge National Lab., Tenn. Energy Div.
ROLE OF TRENCH CAPS IN THE SHALLOW LAND BURIAL OF LOW LEVEL WASTES
L. J. Mezga May 1984 21 p refs
(Contract DE-AC05-84OR-21400)
(DE84-011824; ORNL/TM-9156) Avail: NTIS HC A02/MF A01

Experience dating back to the early 1940s clearly documents the importance of isolating waste disposed of by shallow land burial from the biosphere. While no significant threat to the health and safety of the public has occurred to data, poor facility siting and/or design has resulted in a number of sites failing to perform as predicted or in an acceptable manner. The trench cap may be the single most important component of the LLW disposal system. It must effectively isolate the waste from the biosphere by controlling infiltration, gaseous emissions, and biointrusions. At the same time, a number of other forces (i.e., erosion and subsidence) are acting to destroy its integrity. Results of experiments and operational experience to date indicate that while one design feature may be effective at controlling one problem (e.g., cobble gravel effectively controls biointrusion), that same design feature may be ineffective or actually exacerbate another problem (e.g., cobble gravel may allow increased infiltration rates). Therefore, trench cap design must evaluate the systems effects of the various options either using intuitive methods as is currently the case or by using mathematical models which are currently being developed and validated. Author

N84-30945# Sandia Labs., Albuquerque, N. Mex.
AMBIENT TEMPERATURE TESTING OF THE G-TUNNEL HEATED BLOCK
Roger M. Zimmerman, Mark P. Board, Ernest L. Hardin, and M. D. Voegele 1984 15 p refs Presented at the 25th US Symp. on Rock Mech., Evanston, Ill., 25 Jun. 1984 Prepared in cooperation with Science Applications, Inc., La Jolla, Calif.
(Contract DE-AC04-76DP-00789)
(DE84-009927; SAND-83-2287C; CONF-840633-13) Avail: NTIS HC A02/MF A01

The G-tunnel heated block experiment is conducted on the Nevada Test Site (NTS) as part of the Nevada Nuclear Waste Storage Investigations project (NNWSI). The purpose of the ambient temperature testing phase is to evaluate rock-mass mechanical properties of a block (approx. 8 m(3)) under biaxial stress changes up to 7.5 MPa above an initialization in situ value of 3.1 MPa. Results indicate that the modulus of deformation ranges from 9.7 to 17.0 GPa and Poisson's ratio ranges from 0.21 to 0.33. In general, the higher values of the modulus and Poisson's ratio were influenced by fracture propagations parallel to the compressive stress field. Other measurements indicated that cross-hole compression (p) wave velocities and single fracture permeability values were relatively insensitive to stress changes above the in situ value. DOE

N84-30946# Southern Science, Dunedin, Fla..
A STUDY OF RESEARCH NEEDS AND PRIORITIES IN RADIOACTIVE WASTE MANAGEMENT
Stanley E. Turner, William E. Carson, and Walter Mitchell, III Feb. 1984 74 p
(Contract DE-AC01-82ER-30042)
(DE84-009045; DOE/ER-30042/T1) Avail: NTIS HC A04/MF A01

The results of an assessment of long-range research needs in nuclear waste management are presented. The purpose is to aid the Director of Energy Research in determining the health of DOE's research programs. The intent was to identify additional, basic research necessary in the 1980s and 1990s to develop an adequate scientific data base for nuclear waste management activities likely to be important around the turn of the century.

The recommendations resulted from an overview of the entire area of nuclear waste management, not from focused examinations of narrow topics within that area. The suggested research may be the subject of future studies or more intense work by DOE. The recommendations presented are not accompanied by designations of responsible program offices within DOE. It is anticipated that the contents will be shared with the program offices involved and that those offices will recognize and respond to recommendations within their purviews. DOE

N84-30947# Los Alamos Scientific Lab., N. Mex.
HIGH ENERGY NUCLEAR STRUCTURES
J. Boguta (California Univ., Lawrence Berkeley Lab.) and J. Kunz 1984 5 p refs Presented at the Nucl. Dyn. Workshop 3, Copper Mountain, Colo., 4-9 Mar. 1984
(Contract W-7405-eng-36)
(DE84-010062; LA-UR-84-823; CONF-8403101-6) Avail: NTIS HC A02/MF A01

In conventional nuclear physics the nucleus is described as a non-relativistic many-body system, which is governed by the Schroedinger equation. Nucleons interact in this framework via static two-body potentials, mesonic degrees of freedom are neglected. An alternative description of nuclear physics in terms of a relativistic field theory was developed by Walecka. The model Lagrangian containing baryons, sigma-mesons and (LC OMEGA)-mesons was subsequently extended to include also (PI)-mesons and rho-mesons. An essential feature of such a nuclear Lagrangian is its renormaliability. In addition to the description of known nuclear structure the field theoretical approach may reveal entirely new nuclear phenomena, based on the explicit treatment of mesonic degrees of freedom. The existence of such abnormal nuclear states was proposed by Lee and Wick employing the sigma-model Lagrangian. There the nonlinearity of the meson field equations allows for soliton solutions in the presence of nucleons, in particular the sigma-field may exhibit a kink. DOE

N84-30948# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
APL/JHU FREE FLIGHT TESTS OF THE GENERAL PURPOSE HEAT SOURCE MODULE. TESTING: 5-7 MARCH 1984
Wendell M. Baker, II 1984 42 p refs
(Contract DE-AI01-77ET-20342)
(DE84-011065; DOE/ET-20342/T12) Avail: NTIS HC A02/MF A01

The purpose of the test was to obtain statistical information on the dynamics of the General Purpose Heat Source (GPHS) module at terminal speeds. Models were designed to aerodynamically and dynamically represent the GPHS module. Normal and high speed photographic coverage documented the motion of the models. Test parameters and techniques for the free-spin tests are documented. Data analysis are not included. Author

N84-30949# National Inst. voor Kernfysica en Hoge Energieysica, Amsterdam (Netherlands).
[ACTIVITIES IN NUCLEAR AND HIGH ENERGY PHYSICS] Annual Report, 1982 [JAAVERSLAG 1982]
1983 133 p refs In DUTCH
(B8467321) Avail: NTIS HC A07/MF A01

High energy and nuclear physics research concerning bubble chamber investigations, European hybrid system; ACCMOR, WA 18, PETRA, PEP, VA 4, SING, LENA, LEP 3 and DELPHI experiments is summarized. Experiments with electron beams, and in pions and muons physics, and radiochemistry are reported on. Author (ESA)

N84-30950# Institute of Oceanographic Sciences, Wormley (England).
KING'S TROUGH FLANK: GEOLOGICAL AND GEOPHYSICAL INVESTIGATIONS OF ITS SUITABILITY FOR HIGH-LEVEL RADIOACTIVE WASTE DISPOSAL
R. B. Kidd, R. C. Searle, P. P. Weaver, C. L. Jacobs, Q. J. Huggett, M. J. Noel, and P. J. Schultheiss 1983 113 p refs Original contains color illustrations
(Contract DGR-481/179)
(IOS-166; DOE/RW-83/160) Avail: NTIS HC A06/MF A01

The King's Trough Flank area in the Northeast Atlantic Ocean was chosen to examine the suitability of pelagic carbonate sequences for sub-seabed disposal of high-level radioactive waste. Geophysical data and sediment samples were collected. The region is a rugged portion of the deep ocean floor with hills and scarps 10 to 30 km apart and slopes around the hills ranging from 18 deg to 30 deg. Areas of relatively smooth seafloor occur, however, up to 35 km across, where slopes no greater than 2 deg are recorded. Discrepancy between the geophysical and sediment core data leaves uncertainty regarding the stability of the sediment cover and the likelihood of current erosion in these areas. The general suitability of the area is discussed by comparing data with the set of desirable characteristics for a sub-seabed disposal site. Difficulties in extrapolating findings from sampled depths of up to 10 m to depths envisaged for shallow waste disposal are emphasized. Author (ESA)

74 OPTICS

Includes light phenomena.

N84-30951# Hughes Research Labs., Malibu, Calif.
PHASE CONJUGATE OPTICS Final Technical Report, 1 Aug. 1980 - 31 Jan. 1983
G. J. Dunning, M. B. Klein, and R. C. Lind Griffiss AFB, N.Y. RADC Feb. 1984 210 p
(Contract F19628-80-C-0185)
(AD-A141960; RADC-TR-84-18) Avail: NTIS HC A10/MF A01 CSCL 20/6

The purpose of this program has been the study, both theoretically and experimentally, of the use of phase conjugate optics for information processing and image transmission applications. A significant portion of effort was directed toward an improved understanding of the photorefractive effort and its application to two-wave and four-wave mixing. The authors developed a model for grating formation in photorefractive materials and have derived expressions for figures of merit, which aid in selection of materials and the optimization of efficiency and speed. They also developed a model for two-wave mixing in the transient regime, and measured response times for both tow-wave and four-wave mixing. Other devices and materials considered for ODP applications include the Hughes liquid crystal light valve and long-chain organic molecules. Measurements on several ODP configurations were performed. First, they used optical phase conjugation to transmit an image through a 1.75 m multimode fiber, with a resolution of better than 15 lines/mm. Secondly, they demonstrated several static convolution and correlation operations, using character masks. Finally, they investigated the use of phase conjugation for real-time optical correlation. Results of each of these experiments are described. Author (GRA)

N84-30952# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
THE SPOT OF ARAGO AND ITS ROLE IN ABERRATION ANALYSIS M.S. Thesis
D. R. Erbschloe Dec. 1983 297 p
(AD-A141983; AFIT/CI/NR-84-77T) Avail: NTIS HC A13/MF A01 CSCL 20/6

The Spot of Arago is the bright diffraction spot in the center of the shadow behind a circular obstacle. Because this pattern is the result of diffraction at the edge of the obstacle, the spot contains information about the incident beam. If the incident beam contains aberrations, the shape and intensity of the diffraction pattern should change. For points on and near the optical axis, analytical solutions to the Rayleigh-Sommerfeld diffraction integral are possible for a circular obscuration and an annular aperture illuminated by a plane wave of uniform or gaussian intensity distribution and containing defocus and/or spherical aberration. Computer studies of these cases show excellent agreement with experiment. The amount of defocus and spherical aberration can be deduced by intensity measurements and shift in positions of on axis intensity extrema behind an annular aperture. An empirical study of astigmatism revealed a predictable change in the diffraction pattern allowing for the verification of the aberration to within .05 wavelengths. The Spot of Arago is inherent in many optical systems due to the geometry of components. The technique of aberration determination by changes in the diffraction pattern should be useful in such systems. Author (GRA)

N84-30953# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
SWITCHABLE ZERO ORDER DIFFRACTION GRATINGS AS LIGHT VALVES Semiannual Report, 1 Oct. 1983 - 31 Mar. 1984
J. Melngailis 20 Apr. 1984 5 p
(Contract N00014-84-K-0073)
(AD-A142513) Avail: NTIS HC A02/MF A01 CSCL 20/6

The goal of this project is to produce a light valve based on the principle of the cancellation of the zero order of diffraction. The light valve works by the displacement of two facing aligned phase gratings with respect to one another by half of a grating period. The light valve is to be simple and mass producible into matrix addressable arrays. Such arrays would serve as displays or as spatial light modulators in optical signal processing. The material we have chosen to fabricate such valves is polyvinylidine fluoride (PVF2). It is transparent to visible light and is also strongly piezoelectric. The piezoelectricity would exploited to produce the motion. On the basis of our previous research we have chosen to fabricate the gratings by embossing and to produce the motion using a chevron geometry which amplifies the motion created by the piezoelectricity. Author (GRA)

N84-30954# Scripps Institution of Oceanography, La Jolla, Calif. Visibility Lab.
ANALYTIC TECHNIQUES FOR ESTIMATING VISIBLE IMAGE TRANSMISSION PROPERTIES OF THE ATMOSPHERE Interim Scientific Report
W. S. Hering Hanscom AFB, Mass. AFGL Aug. 1983 41 p
(Contract F19628-82-C-0060)
(AD-A142524; SIO-REF-84-6; AFGL-TR-83-0236; SR-3) Avail: NTIS HC A03/MF A01 CSCL 20/6

The development of field oriented techniques for determining the atmospheric effects on visible image transmission are described in this report. Simplified analytic methods are presented for calculating the background sky, cloud and terrain radiance distribution, and in turn the spectral contrast transmittance, of inclined paths of sight in the atmosphere. The directional path radiance is determined as the sum of the singly scattered sunlight component and a multiply scattered diffuse component that is calculated through application of the delta-Eddington approximation. Performance tests of the model radiance calculations were carried out through comparisons with results from more comprehensive radiative transfer models and by direct comparisons with high-resolution scanning radiometer measurements gathered by instrumented aircraft in a broad range of environmental conditions. Techniques for the representation of the optical parameters required as model input data are presented and discussed, including the specification of cloud optical depth as a function of cloud type. An added feature of the contrast transmittance modeling system deals with the combined influences of atmospheric and target factors in order to calculate visual detection range for objects located at the surface and viewed from alot. Analytic representations of vision experiment data are added along with target information to explore the relative sensitivity of detection range to selected changes in target and atmospheric parameters. Results are presented for several examples assuming simplified targets and backgrounds. GRA

N84-30955# United Technologies of New Mexico, Inc., East Hartford, Conn.
OPTICAL SUPPORT HARTMANN SENSOR OPTICAL SIMULATION Final Report, Aug. - Oct. 1983
J. L. Forgham and H. D. McIntire Kirtland AFB, N. Mex. AFWL May 1984 32 p
(Contract F29601-83-C-0023)
(AD-A142525; AFWL-TR-83-115) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report describes the development and validation of a computer simulation of Hartmann sensor optical performance. A brief study was performed using the validated code to evaluate the sensitivity of Hartmann sensor performance to sensor design parameters and input beam aberration characteristics. Significant loss of aberration mode fidelity can result from failure to account for the effects of partially illuminated Hartmann plate subapertures. Such mode fidelity degradations tend to be less severe with moderately high resolution plate designs (e.g., 12 x 12). Author (GRA)

N84-30956# University of Southern California, Los Angeles. Image Processing Inst.
NONLINEAR REAL-TIME OPTICAL SIGNAL PROCESSING Annual Technical Report, 15 Apr. 1982 - 14 Apr. 1983
A. A. Sawchuk, T. C. Strand, and A. R. Tanguay, Jr. 1 Dec. 1983 133 p Prepared in cooperation with Hughes Research Labs., Malibu, CA
(Grant AF-AFOSR-0082-81)
(AD-A142619; USCIPI-1100; AFOSR-84-0538TR) Avail: NTIS HC A07/MF A01 CSCL 20/6

The results of the second year of a two year research program in nonlinear real-time optical signal processing are described. The research has concentrated on optical sequential logic systems for parallel digital processing and on variable grating mode (VGM) liquid crystal real-time spatial light modulators. The goal of the program is to extend fast parallel nonlinear operations to optical processing systems with large time-bandwidth and space-bandwidth products. Parallel and twisted nematic liquid crystal light valve (LCLV) devices have been used as a nonlinear element in a feedback arrangement in the binary sequential logic system. A computer generated hologram fabricated on an e-beam system serves as a beamsteering interconnection element. A completely optical oscillator and frequency divider have been experimentally demonstrated, and various circuit interconnection techniques have been explored. Research has continued on variable-grating mode (VGM) liquid crystal devices that perform local spatial frequency modulation as a function of the incident intensity. GRA

N84-30957# Armed Forces Radiobiology Research Inst., Bethesda, Md.
KARNOVSKY-OSMIUM AS A PRIMARY FIXATIVE FOR ELECTRON MICROSCOPY
G. M. Buchanan Sep. 1983 5 p
(AD-A142671; AFRRI-SR83-23) Avail: NTIS HC A02/MF A01 CSCL 20/6

A combined Karnovsky-osmium tetroxide primary fixative is proposed for transmission electron microscopy. This fixative, hypothetically, seems to overcome the drawbacks of sequential fixation techniques. Evaluation of this combined fixative reveals very acceptable fixation of hepatocytes, lymphocytes, and fibroblasts, as well as various organelles within these cells. Author (GRA)

N84-30958# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
OPTICAL SECOND-HARMONIC GENERATION FOR SURFACE STUDIES
Y. R. Shen Jan. 1984 5 p Presented at the Opt. Soc. of Am. Conf. on Lasers and Electro-Opt., Anaheim, Calif. 19-22 Jun. 1984
(Contract DE-AC03-76SF-00098)
(DE84-010718; LBL-17386; CONF-806114-1) Avail: NTIS HC A02/MF A01

The development of optical second harmonic generation as a tool for surface studies is reviewed. Recent progress is discussed. DOE

N84-30959# Department of Energy, Washington, D. C.
OMNIDIRECTIONAL FIBER OPTIC TILTMETER Patent Application
Benjamin C. Benjamin and Harvey M. Miller, inventors (to DOE) Filed 30 Jun. 1983 12 p
(Contract DE-AC04-76DP-00789)
(DE84-011109; US-Patent-Appl-SN-509555) Avail: NTIS HC A02/MF A01

A tiltmeter is provided which is useful in detecting very small movements such as earth tides. The device comprises a single optical fiber, and an associated weight affixed thereto, suspended from a support to form a pendulum. A light source, e.g., a light emitting diode, mounted on the support transmits light through the optical fiber to a group of further optical fibers located adjacent to but spaced from the free end of the single optical fiber so that displacement of the single optical fiber with respect to the group will result in a change in the amount of light received by the individual optical fibers of the group. Photodetectors individually connected to the fibers produce corresponding electrical outputs which are differentially compared and processed to produce a resultant continuous analog output representative of the amount and direction of displacement of the single optical fiber. DOE

N84-30960# Rochester Univ., N. Y. Lab. for Laser Energetics.
CHARACTERIZATION OF MICRON-SIZED, OPTICAL COATING DEFECTS BY PHOTOTHERMAL DEFLECTION MICROSCOPY
J. A. Abate, A. W. Schmid, M. G. Guardalben, D. J. Smith, and S. D. Jacobs Apr. 1984 22 p refs
(Contract DE-AC08-80DP-40124; LR-154)
(DE84-011150; DOE/DP-40124/40) Avail: NTIS HC A02/MF A01

Information about the localized absorbing defects in optical thin films is required for a better understanding of laser induced damage. Photothermal deflection microscopy offers a nondestructive optical diagnostic which yields spatially resolved absorption data on simple and multiple layer AR and HR dielectric coatings. The computer controlled apparatus used to generate absorption maps of dielectric thin films and an experiment in which a partial correlation between localized absorption sites and damage caused by nanosecond laser irradiation at 351 nm is established are described. An absolute calibration of absorption for our measurement technique is presented here. Micron sized absorbtive defects of Cu were introduced into our coatings to provide a means of calibration. Also presented here are some preliminary data on the modification of the absorption signatures measured by photothermal deflection as a function of the location of the defect within the coating layers. DOE

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N84-30961 Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
SEMI-IMPLICIT METHOD FOR THREE-DIMENSIONAL COMPRESSIBLE MHD SIMULATION
Douglas S. Harned (New York Univ.) and W. Kerner Mar. 1984 32 p refs
(IPP-6/234) Copyright. Avail: Issuing Activity

A semi-implicit method for solving the full compressible MHD equations in three dimensions is presented. The method is unconditionally stable with respect to the fast compressional modes. The time step is instead limited by the slower shear Alfven motion. The computing time required for one time step is essentially the same as for explicit methods. Linear stability limits are derived and verified by three-dimensional tests on linear waves in slab geometry. Author (ESA)

N84-30962*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME CONTRIBUTIONS TO KNOWLEDGE OF THE MAGNETOSPHERIC PLASMA BY ISEE INVESTIGATORS
K. W. Ogilvie Jun. 1984 35 p refs
(NASA-TM-86124; NAS 1.15:86124) Avail: NTIS HC A03/MF A01 CSCL 20I

The ISEE project has made substantial contributions to the knowledge of the magnetosphere during the period of the IMS, especially in the discipline of Space Plasma Physics. Results obtained during approximately the first two years of the operation of ISEE-1 and -2, and touches on relevant results of ISEE-3 are reviewed. The ability to control the separation between ISEE-1 and -2, which are in nearly identical orbits, has permitted study of the motion and structure of the bow shock and magnetopause, the boundary layers, and the plasma sheet. Much evidence was obtained favoring the existence of reconnection and its relevance to the transfer of magnetic flux from the frontside to the rear of the magnetosphere, although not everyone agrees that it is the only important process. The presence of both reflected and accelerated particles was shown to lead to the development of a foreshock region between the bow shock and the interplanetary magnetic field line tangential to it. Author

N84-30963# Nagoya Univ. (Japan). Inst. of Plasma Physics.
KOLMOGOROV-STYLE ARGUMENT FOR THE DECAYING HOMOGENEOUS MHD TURBULENCE
Tadatsugu Hatori May 1984 23 p refs
(IPPJ-677) Avail: NTIS HC A02/MF A01

Two dimensional and three dimensional magnetohydrodynamic similarity solutions for turbulence were obtained assuming the invariance of the mean square magnetic potential and the magnetic helicity respectively in the limit of infinite Reynolds number. The temporal decay laws of the energy, the cross-helicity, and the magnetic helicity were derived from these similarity solutions. The decay process hypothesis was compared with the one employed by Taylor. R.S.F.

N84-30964# Nagoya Univ. (Japan). Inst. of Plasma Physics.
THE INFLUENCE OF THE RELATIVISTIC CHARACTER OF THE ELECTRON HF MOTION ON THE NON-LINEAR WAVE DYNAMICS IN PLASMAS
V. I. Berezhiani (Academy of Sciences of the Georgian SSR, Tbilisi, USSR), V. S. Paverman (Academy of Sciences of the Georgian SSR, Tbilisi, USSR), N. L. Tsintsadze (Academy of Sciences of the Georgian SSR, Tbilisi, USSR), and D. D. Tskhakaya (Academy of Sciences of the Georgian SSR, Tbilisi, USSR) Apr. 1984 24 p refs
(IPPJ-676) Avail: NTIS HC A02/MF A01

The investigation of high powered electromagnetic radiation interaction with plasma is reviewed. In isotropic and magnetoactive plasmas, a weak relativistic effect substantially affects the character of nonlinear processes. In isotropic plasma this effect gives rise to the new modulational instability regions for longitudinal and transverse waves. The results of nonlinear dynamics investigation of waves in isotropic plasmas, circularly polarized waves in the cyclotron resonance region, and dynamics of hybrid waves propagating across the magnetic field are presented. It is concluded that the proper account of the relativistic character of the electron motion in the wave field is often necessary for the correct description of the nonlinear dynamics of EM waves in plasmas. E.R.

N84-30965# Nagoya Univ. (Japan). Inst. of Plasma Physics.
FINITE-ELEMENT-ANALYSIS OF FIELDS RADIATED FROM ICRF ANTENNA
Kaoru Yamanaka and Ryo Sugihara Apr. 1984 25 p refs
(IPPJ-675) Avail: NTIS HC A02/MF A01

In several simple geometries, electromagnetic fields radiated from a loop antennas, on which a current oscillately flows across the static magnetic field are calculated by the finite element method (FEM) as well as by analytic methods in a cross section of a plasma cylinder. A finite wave number along the static magnetic field is assumed. Good agreement between FEM and the analytic solutions is obtained, which indicates the accuracy of FEM solutions. The method is applied to calculations of fields from a half turn antenna and reasonable results are obtained. It is found that a straightforward application of FEM to problems in an anisotropic medium may bring about erroneous results and that an appropriate coordinate transformation is needed for FEM become applicable. Author

N84-30966# Nagoya Univ. (Japan). Inst. of Plasma Physics.

FORMATION OF SPATIAL ALFVEN RESONANCE AND GLOBAL MODES IN AN INHOMOGENEOUS PLASMA

Y. Amagishi (Shizuoka Univ., Japan) and A. Tsushima Apr. 1984 24 p refs
(IPPJ-674) Avail: NTIS HC A02/MF A01

By measuring a time evolution of the perturbed magnetic field vectors, the formation of the spatial Alfven resonance layer and global modes were observed in an inhomogeneous plasma. A simple magnetohydrodynamic theory, including the ion-neutral collision effects, was examined to explain partly the experimental results. Author

N84-30967# State Univ. of New York, Albany. Atmospheric Sciences Research Center.

THE GAS-HEATING PHASE IN ELECTRICAL BREAKDOWN Final Technical Report, Oct. 1982 - Jul. 1983

E. Barreto Wright-Patterson AFB, Ohio AFWAL Oct. 1983 38 p
(Contract N00014-80-C-0132; AF Proj. 2402)
(AD-A141961; ASRC-PUB-970; AFWAL-TR-83-3124) Avail: NTIS HC A03/MF A01 CSCL 20/9

This report focuses attention on the neglected gas-heating stage associated with a spark. A brief review is followed by summaries of recent experimental and theoretical investigations. It is shown that in all cases gas heating is preceded by the formation of a weakly ionized plasma. The transformation to a strongly ionized gas requires additional ionization that can be associated with several different physical processes. In small gaps (3.0 mm) with metal electrodes, the influx of electrons from a cathode spot with at least a single cell is responsible for gas heating. In longer gaps (1 to 3 cm) highly luminous ionization waves are produced. These can be reflected at the electrodes and increase the degree of ionization. They are well known but not clearly explained in longer discharges. This stage is followed by the formation of hot filaments either at the electrodes or in mid gap. These seem to be associated with the onset of effective ion-electron interactions. In large surface discharges (approx. 1.0 m) the glow and hot channel behind it constitute a stable propagating unit that seems to be controlled by three body electron-ion recombination. The properties of these gliding discharges are similar to those of lightning leaders. In all cases there is strong evidence to support the concept of fluid dynamic effects associated with the hot electron population in the weakly ionized gas. Thus the propagation of stable discontinuities, either strong (shocks) or weak, is shown to be possible. Author (GRA)

N84-30968# Texas Univ. at Dallas, Richardson. Center for Space Sciences.

DRIFT SCINTILLATION METER Final Report, 15 Jun. 1979 - 31 Mar. 1984

Hanscom AFB, Mass. AFGL Mar. 1984 40 p
(Contract F19628-79-C-0108)
(AD-A142523; UTD-22831-961; AFGL-TR-84-0103) Avail: NTIS HC A03/MF A01 CSCL 20/9

This is the final report for the subject contract under which The University of Texas at Dallas (UTD) built, tested and delivered an engineering model and three flight versions of the Drift Scintillation Meter (DSM) to the Air Force Geophysics Laboratory for flight on the Air Force DMSP satellites. The report is divided into three sections. Section 1 contains the instrument description and theory of operation. Section 2 contains a description of planned spacecraft-level instrument testing, stimulation requirements and instrument handling and safety. Section 3 contains an instrument interconnection diagram and a list of the schematics, drawings, parts lists and wiring lists that describe the as-built configuration of the instrument. This documentation is available in the R&D Equipment Information Reports that were submitted to AFGL after each instrument delivery. Author (GRA)

N84-30969# California Univ., Los Angeles.

MAGNETIC FUSION ENERGY PLASMA INTERACTIVE AND HIGH HEAT FLUX COMPONENTS. VOLUME 1: TECHNICAL ASSESSMENT OF THE CRITICAL ISSUES AND PROBLEM AREAS IN THE PLASMA MATERIALS INTERACTION FIELD

R. W. Conn, ed., W. B. Gauster, ed., D. Heifetz, ed. (Princeton Univ.), E. Marmar, ed. (MIT, Cambridge), and K. L. Wilson, ed. Jan. 1984 172 p refs Sponsored by DOE
(DE84-011527; UCLA/PPG-765-Vol-1) Avail: NTIS HC A07/MF A01

A technical assessment of the critical issues and problem areas in the field of plasma materials interactions (PMI) in magnetic fusion devices shows these problems to be central for near-term experiments, for intermediate-range reactor devices including D-T burning physics experiments, and for long-term reactor machines. Critical technical issues are ones central to understanding and successful operation of existing and near-term experiments/reactors or devices of great importance for the long run, i.e., ones which will require an extensive, long-term development effort and thus should receive attention now. Four subgroups were formed to assess the critical PMI issues along the four major lines: (1) PMI and plasma confinement physics experiments; (2) plasma-edge modelling and theory; (3) surface physics; and (4) materials technology for in-vessel components and the first wall. DOE

N84-30970# Dartmouth Coll., Hanover, N.H.

ELECTRON CYCLOTRON RADIATION FROM MIRROR-CONFINED PLASMA Final Report

1983 7 p refs
(Contract DE-AC02-81ER-53110)
(DE84-008665; DOE/ER-53110/1) Avail: NTIS HC A02/MF A01

Research involving the electron cyclotron radiation emitted by magnetically confined plasmas was outlined briefly. A computer program was written which calculates the synchrotron emission in an arbitrary direction from a volume element of plasma. In the code the distribution function was left arbitrary, which makes the code useful for situations where the distribution function is not expected to be Maxwellian for the EBT hot electron ring plasma, the thermal barrier plasma in tandem mirror machines, and a Tokamak plasma during current drive experiments. R.S.F.

N84-30971# Argonne National Lab., Ill.

LIQUID METAL BREEDER-COOLANT BLANKET CONCEPT

D. K. Sze, Y. S. Cha, Y. Gohar, S. Majumdar, P. Picologlou, and D. L. Smith Jan. 1984 5 p Presented at the Ann. Meeting of the Am. Nucl. Soc., New Orleans, 3-8 Jun. 1984
(Contract W-31-109-eng-38)
(DE84-006554; CONF-840614-39) Avail: NTIS HC A02/MF A01

The results and conclusions of a self-cooled, liquid-metal design for a D-T fusion reactor, which is part of the Blanket Comparison and Selection Study (BCSS) are discussed. The effort reported emphasizes the inboard blanket of a Tokamak since the problem is most severe in this region. The work on a self-cooled TRM is also reported. DOE

N84-30972# Los Alamos Scientific Lab., N. Mex. Center for Nonlinear Studies and Theoretical Div.

GENERALIZED POISSON BRACKETS AND NONLINEAR LIAPUNOV STABILITY: APPLICATION TO REDUCED MHD

R. D. Hazeltine (Texas Univ., Austin), D. D. Holm, J. E. Marsden (California Univ., Berkeley), and P. J. Morrison (Texas Univ., Austin) 1984 7 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract W-7405-eng-36)
(DE84-009973; LA-UR-84-942; CONF-840616-12) Avail: NTIS HC A02/MF A01

A method is presented for obtaining Liapunov functionals (LF) and proving nonlinear stability. The method uses the generalized Poisson bracket (GPB) formulation of Hamiltonian dynamics. As an illustration, certain stationary solutions of ideal reduced MHD (RMHD) are shown to be nonlinearly stable. This includes Grad-Shafranov and Alfven solutions. DOE

N84-30973# Los Alamos Scientific Lab., N. Mex. Theoretical Div. and Center for Nonlinear Studies.

LYAPUNOV STABILITY CONDITIONS FOR A RELATIVISTIC MULTIFLUID PLASMA

Darryl D. Holm and Boris A. Kupershmidt (Tennessee Univ.) 1984 9 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract W-7405-eng-36)
(DE84-010004; LA-UR-84-1127; CONF-840616-6) Avail: NTIS HC A02/MF A01

In preparation for establishing nonlinear stability conditions, the Hamiltonian structure is given for ideal relativistic multifluid plasma dynamics in the laboratory frame with the Hamiltonian functional equaling the relativistic energy minus the mass energy. The noncanonical Poisson bracket for this system turns out to be the same as for the nonrelativistic multifluid plasma, but with dynamical variables replaced by their relativistic counterparts. New constants of the motion are then derived from the Hamiltonian structure and used as Lyapunov functionals for proving sufficient conditions for nonlinear stability of relativistic multifluid plasma equilibria. The nonrelativistic limit of the formulation is uniformly regular, and nonlinear Lyapunov stability conditions derived earlier for a nonrelativistic multifluid plasma reemerge in that limit. DOE

N84-30974# KMS Fusion, Inc., Ann Arbor, Mich.

VUV INSTRUMENT CALIBRATIONS FOR LASER-PLASMA STUDIES

P. D. Rockett, C. R. Bird, and R. Shepherd May 1984 14 p refs
(Contract DE-AC08-82DP-40152)
(DE84-010507; DOE/DP-40152/T5) Avail: NTIS HC A02/MF A01

Techniques for spectral and intensity calibrations of laser plasma VUV instrumentation are described. A flexible laboratory X-ray station is shown to yield creditable results. DOE

N84-30975# Los Alamos Scientific Lab., N. Mex.

EQUILIBRIUM AND STABILITY OF THE LOS ALAMOS SPHEROMAK

G. Marklin 1984 6 p refs Presented at 6th US-Japan Symp. on Compact Toroid Res., Princeton, 20 Feb. 1984
(Contract W-7405-eng-36)
(DE84-010064; LA-UR-84-748; CONF-840255-18) Avail: NTIS HC A02/MF A01

The open mesh flux conserver (MFC) on the Los Alamos spheromak (CTX) was equipped with a large number of Rogowski loops measuring the current in the individual segments of the MFC, providing a complete picture of the surface current pattern induced by the equilibrium and oscillations of the confined plasma. An analysis was made of the data from these Rogowski loops. DOE

N84-30976# General Atomic Co., San Diego, Calif.

THE 3-D MHD STABILITY OF HIGH-BETA FREE-BOUNDARY TOKAMAK PLASMAS WITH FINITE EDGE-PRESSURE-GRADIENT AND LIMITER STABILIZATION

J. K. Lee, L. C. Bernard, M. S. Chu, R. W. Moore, and N. Ohyabu Feb. 1984 6 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract DE-AT03-84ER-53158)
(DE84-009188; GA-A17483; CONF-840616-1) Avail: NTIS HC A02/MF A01

Ideal and resistive external kink tearing ballooning modes are studied for high beta toroidal Tokamak plasmas with a varying pedestal and/or with stabilization due to a limiter. When the pedestal value is small, the mode spectrum peaks near $n=1$ with a monotonically decreasing growth rate in n, in which case the most unstable mode has a structure similar to an ideal external kink mode. As the pedestal value increases, the linear growth rate decreases for a fixed beta and the mode spectrum tends to broader. The perturbation becomes localized near the plasma edge resembling the edge relaxation phenomenon in an H mode Tokamak discharge. The stabilizing effect of a limiter on high beta MHD modes is considered for a finite size toroidal limiter, a poloidal limiter, and a general limiter. For the latter two types of limiters, a 3-D linear stability analysis is necessary, coupling both poloidal and toroidal modes. The high beta toroidal case has different characteristics from the zero beta cyclindrical case; among them is a substantial reduction in growth rate even with modest contact area. DOE

N84-30977# Department of Energy, Washington, D. C.

STEADY STATE COMPACT TOROIDAL PLASMA PRODUCTION Patent Application

William C. Turner, inventor (to DOE) Filed 17 May 1983 21 p
(DE84-011090; US-Patent-Appl-SN-495386) Avail: NTIS HC A02/MF A01

This invention relates to the confinement of field reversed plasma rings and more particularly, to the steady state maintenance of field reversed plasma rings produced by coaxial plasma guns. DOE

N84-30978# JAYCOR, San Diego, Calif.

THEORETICAL STUDIES OF ELMO BUMPY TORUS (EBT) Annual Report

Oct. 1983 53 p refs
(Contract DE-AC01-82ER-53126)
(DE84-010814; DOE/ER-53126/T1) Avail: NTIS HC A04/MF A01

Research work on Elmo Bumpy Torus (EBT) was reviewed. Topics included the following: modeling studies comparing neoclassical and Fokker-Planck analyses of the core plasma electrons with EBT data; ion physics studies treating propagation and absorption of ion cyclotron waves along with investigation of the effect of wave absorption and instabilities on the ion distribution function; parametric instability calculations identifying processes and thresholds for nonlinear electron cyclotron resonance (ECR) wave absorption; ring physics studies considering not only energetics and spatial effects, but also scaling and startup scenarios, along with the attendant microwave power requirements; radio frequency (RF) control studies considering the possibility of influencing transport by wave absorption; and microwave deposition studies considering the geometric aspects of propagation and absorption of microwaves in a real EBT cavity system. DOE

N84-30979# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

LINEAR THEORY OF LOWER HYBRID HEATING

Paul Bonoli 27 Mar. 1984 63 p refs
(Contract DE-AC02-78ET-51013)
(DE84-010577; DOE/ET-51013/120; PFC/RR-84-5) Avail: NTIS HC A04/MF A01

The linear theory of wave propagation in the lower hybrid range of frequencies is presented. The topics of accessibility, linear and quasi-linear theories of electron Landau damping, and the linear theory of ion Landau damping are covered. The theory of wave propagation is extended to include the effect of toroidal geometry. A simulation model incorporating these theories is described and numerical results obtained with the model are given. DOE

N84-30980# Los Alamos Scientific Lab., N. Mex.

ION REFLECTION, GYRATION, AND DISSIPATION AT SUPERCRITICAL SHOCKS

J. T. Gosling and A. E. Robson (NRL, Washington, D.C.) 1984 35 p refs Presented at the Napa Shock Conf., Napa Valley, Calif., 20-24 Feb. 1984
(Contract W-7405-eng-36)
(DE84-011353; LA-UR-84-1391; CONF-840256-2) Avail: NTIS HC A03/MF A01

Topics on collisionless plasmas are discussed and include: (1) ion reflection is the dominant ion dissipation mechanism at nearly perpendicular, supercritical shocks. (2) An increasing fraction of the ions incident on a supercritical shock is reflected as the Mach number increases. The actual fraction reflected can be predicted using the Rankine Huqoniot conservation relations. (3) The effective temperature associated with the dispersion in velocity space associated with ion reflection accounts for a large fraction of the temperature rise observed across supercritical, quasi perpendicular shocks. DOE

N84-30981# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

LOWER HYBRID EXPERIMENTS AT THE 1 MW LEVEL ON ALCATOR C: HEATING AND CURRENT DRIVE

M. Porkolab, B. Lloyd, J. J. Schuss, Y. Takase, S. Texter, R. Watterson, P. Bonoli, R. Englade, C. Fiore, R. Gandy et al Apr. 1984 18 p refs Presented at the 4th Intern. Symp. on Heating in Toroidal Plasmas, Rome, 21-28 Mar. 1984
(Contract DE-AC02-78ET-51013)
(DE84-010586; DOE/ET-51013/121; PFC/CP-84-7; CONF-840311-11) Avail: NTIS HC A02/MF A01

Lower hybrid current drive and heating experiments were carried out on the Alcator C Tokamak at power levels up to 1.15 MW in the density range 1.0 x 10(13) less than or equal to anti n/sub e/cm(-3) less than or equal to 1.0 x 10(14). By launching waves with 67(0), 90(0) or 112(0) phasing of adjacent waveguides, maximum flat-top current drive efficiencies of eta = R(m) x n(10(14)cm(-3))I(MA)/P(MW) = 0.12 AT B = 10 tesla, and eta approx. = 0.08 at B 8 tesla were obtained with molybdenum limiters. With graphite, or silicon-carbide coated graphite limiters the efficiencies were 30 to 40% lower. Current ramping experiments were carried out at densities up to anti n approx. = 6 x 10(13)cm (-3). By phasing the adjacent waveguides at 180(0), heating experiments were performed in the density range 8 x 10(13) less than or equal to anti n(cm(-3)) less than or equal to 2 x 10(14) in both hydrogen and deuterium plasmas. This range of densities corresponds to the electron Landau heating mode. DOE

N84-30982# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

REALISTIC MODELLING OF LOWER HYBRID CURRENT DRIVE WITH MULTIPLE CODES

Paul Bonoli, R. Englade, and M. Porkolab 27 Mar. 1984 18 p refs Presented at the 4th Intern. Symp. on Heating in Toroidal Plasmas, Rome, 21 Mar. 1984
(Contract DE-AC02-78ET-51013)
(DE84-010576; DOE/ET-51013/119; PFC/CP-84-6; CONF-840311-10) Avail: NTIS HC A02/MF A01

A computer model for lower hybrid current drive was developed which combines a radial transport code, a Fokker-Planck solver, and a toroidal ray tracing code. The physical mechanism in the model which allows incident lower hybrid wave power at high parallel phase velocity to eventually interact with lower phase velocity electrons and thus form a significant quasilinear plateau, is the toroidal upshift that occurs in the parallel wavenumber. The resulting RF current generation and its dependency on toroidal magnetic field agree well with experiment. DOE

N84-30983# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

PLASMA FUSION CENTER TECHNICAL RESEARCH PROGRAMS

Jan. 1984 123 p
(Contract DE-AC02-78ET-51013)
(DE84-007954; DOE/ET-51013/112; PFC/RR-84-3) Avail: NTIS HC A06/MF A01

A summary of Plasma Fusion Center research activities is given. Particular emphasis is placed on describing: (1) technical progress during the past year, (2) future plans, and (3) research programs and objectives at the individual research group level. In particular, the following are covered: (1) applied plasma physics, (2) toroidal confinement experiments, (3) mirror confinement experiments, (4) fusion technology and engineering, and (5) fusion systems. DOE

N84-30984# Los Alamos Scientific Lab., N. Mex.

SPACE RESOLVED ABSOLUTELY CALIBRATED VUV SPECTROSCOPIC MEASUREMENTS ON CTX

Hiroshi W. Hoida, Cris W. Barnes, Ivars Henins, Thomas R. Jarboe, and Arthur R. Sherwood 1984 6 p refs Presented at the 6th US-Japan Symp. on Compact Toroid Res., Princeton, 20 Feb. 1984
(Contract W-7405-eng-36)
(DE84-007490; LA-UR-84-622; CONF-840255-4) Avail: NTIS HC A06/MF A01

Space resolved particle confinement times were measured in two independent methods in CTX. The confinement time near the magnetic axis was found to be tau/sub p/ approx. 100 microns and a factor of two lower for the outer flux surfaces. Attempts at sustainment so far have resulted in cold plasmas and additional impurities being injected with the flux. This problem is being specifically addressed in the electrode facility. DOE

N84-30985# Los Alamos Scientific Lab., N. Mex.

MIXED MODE OPERATION IN CTX

H. W. Hoida, C. W. Barnes, Ivars Henins, and T. R. Jarboe 1984 4 p refs Presented at the 6th US-Japan Symp. on Compact Toroid Res., Princeton, 20-23 Feb. 1984
(Contract W-7405-eng-36)
(DE84-007493; LA-UR-84-626; CONF-840255-12) Avail: NTIS HC A02/MF A01

Mixed method of operation with input powers of 10 MW to 20 MW results in hotter ((DELTA)T/sub e/ approx. 30eV) longer lived spheromaks (approx. 200 (MU)s longer) than slow mode operation. However, a further increase in driving current is detrimental to the temperature of the spheromak (possibly due to the injection of impurities). In the mixed method, n = 2 oscillations no longer appear during the decay, apparently due to the sustainment of currents in the outer flux surfaces. This sustainment leads to more uniform j/B profiles, which may stabilize the n = 2. DOE

N84-30986# Los Alamos Scientific Lab., N. Mex.

OHMIC HEATING TO 100-eV AND HELICITY INJECTION IN CTX

Ivars Henins, Cris W. Barnes, Hiroshi W. Hoida, Thomas R. Jarboe, Phillip L. Klingner, Stephen O. Knox, David A. Platts, Arthur R. Sherwood, and Bradford W. Wright 1984 5 p refs Presented at the 6th US-Japan Symp. on Compact Toroid Res., Princeton, 20 Feb. 1984
(Contract W-7405-eng-36)
(DE84-007494; LA-UR-84-621; CONF-840255-5) Avail: NTIS HC A02/MF A01

In the year since the last CT symposium, two major CTX results were achieved. Electron temperatures over 100 eV were obtained and the magnetic fields of the spheromaks were sustained by helicity injection from the coaxial magnetized plasma source. The behavior and magnitude of the fields in the spheromak can be predicted from just the source voltage and flux by assuming a constant rate of helicity loss by resistive decay. DOE

N84-30987# Los Alamos Scientific Lab., N. Mex.

CONFINEMENT TIME AND ENERGY BALANCE IN THE CTX SPHEROMAK

Cris W. Barnes, Ivar Henins, Hiroshi W. Hoida, and Thomas R. Jarboe 1984 6 p refs Presented at the 6th US-Japan Symp. on Compact Toroid Res., Princeton, 20 Feb. 1984
(Contract W-7405-eng-36)
(DE84-007491; LA-UR-84-620; CONF-840255-8) Avail: NTIS HC A02/MF A01

The multipoint Thomson scattering diagnostic on CTX allows measurement of electron plasma pressure. The pressure correlates well with the poloidal flux function. Analysis using equilibrium models allows the < (BETA) >/sub vol/ to be calculated from over 100 Thomson scattering profiles taken under standard conditions of spheromak operation where the plasma parameters vary widely within the discharge. The calculated tau/sub E/ increases with central core temperature and with density. The global magnetic energy decay time tau/sub B/2 is consistent with Spitzer-Herm resistivity, but with an anomaly factor of 2 to 4 which may decrease at small ratios of B/n. The n tau/sub E/ product reaches 4 to 10(9) s cm(-3) during the hottest part of the discharge. A zero-dimensional energy balance code, which accurately includes all the major atomic physics processes and whose parameters have been constrained by comparison to experimental data, is used to identify the causes of energy loss that contribute to the observed confinement time. DOE

N84-30988# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.

THEORETICAL ASPECTS OF MIRROR FUSION Annual Progress Report, 1 Apr. 1983 - 31 Mar. 1984

Dwight R. Nicholson and Georg E. Knorr Mar. 1984 13 p
(Contract DE-AC02-82ER-53136)
(DE84-009139; DOE/ET-53136/7) Avail: NTIS HC A02/MF A01

The techniques of theoretical and computational plasma physics were applied to two important problems in mirror fusion. First, electron collisions with neutral gas play an important role in determining the leak width of a cusp confined plasma. Second, mirror plasmas are susceptible to parametric instabilities during electron cyclotron resonance heating. DOE

N84-30989# Los Alamos Scientific Lab., N. Mex.

ANALYSIS OF SURFACE CURRENTS ON THE CTX MESH FLUX CONSERVER

Bradford L. Wright 1984 5 p refs Presented at the 6th Symp. on Compact Toroid Res., Princeton, N.J., 20 Feb. 1984
(Contract W-7405-eng-36)
(DE84-007491; LA-UR-84-623; CONF-840255-14) Avail: NTIS HC A02/MF A01

The use of discharge cleaning and a mesh structure for the flux conserver have led to hotter, less resistive, spheromak configurations in the CTX experiment. Achievement of these conditions was accompanied by the appearance of oscillations - most notably seen on magnetic probe signals - that were previously not present. These oscillations are observed both during the sustainment (V/sub gun/ not equal to 0) and the decaying (V/sub gun/ =0) phase of the discharge and are attributed to the presence of internal kink modes driven by the departure of the plasma current distribution from the Taylor State: j/B = const. Computations suggest that an n-1 mode becomes unstable when j/B increases away from the magnetic axis (sustained spheromak) whereas an n=2 mode becomes unstable for radially decreasing j/B (decaying spheromak). The results reported are from an 80 cm diameter mesh flux conserver constructed from 0.5 double prime diameter copper stock. It is of the same oblate rooftop design as used for previous work with a dimension of 40 cm from front to back. DOE

N84-30990# Los Alamos Scientific Lab., N. Mex.

TWO NOVEL PLASMA DIAGNOSTICS

Franz C. Jahoda 1984 5 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract W-7405-eng-36)
(DE84-009970; LA-UR-84-923; CONF-840616-8) Avail: NTIS HC A02/MF A01

Single-mode optical fiber sensors and non-linear optics (phase conjugation) are considered as implements for plasma diagnostics. DOE

N84-30991# California Univ., Livermore. Lawrence Livermore Lab.

MICROSTABILITY THEORY FOR DISTRIBUTIONS SEPARABLE IN ENERGY AND PITCH ANGLE

Gary R. Smith 20 Mar. 1984 5 p Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. 1984
(Contract W-7405-eng-48)
(DE84-009683; UCRL-90425; CONF-840616-9) Avail: NTIS HC A02/MF A01

Distribution functions that are separable in energy and pitch angle allow analytical calculation of one or two velocity-space integrals that appear in the linear theory of certain magnetized plasma microinstabilities. Both nonrelativistic and relativistic plasmas were considered herein. DOE

N84-30992# Los Alamos Scientific Lab., N. Mex.

PLASMA SIMULATION STUDIES OF ELECTRON ACCELERATION FOR BEAT WAVE AND SINGLE FREQUENCY-LASER HEATING SCHEMES

J. M. Kindel, D. W. Forslund, W. B. Mori (California Univ., Los Angeles), C. Joshi (California Univ., Los Angeles), and J. M. Dawson (California Univ., Los Angeles) 1984 5 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract W-7405-eng-26)
(DE84-009968; LA-UR-84-1063; CONF-840616-4) Avail: NTIS HC A02/MF A01

Two-dimensional particle simulations with a finite laser beam show that beat wave acceleration can produce energetic electrons as seen in one-dimensional simulations. The competition and interplay between various nonlinear phenomena -- backward Raman scattering, stimulated Compton scattering, self-focusing, filamentation, and harmonic generation -- were delineated through the two-dimensional simulations. R.S.F.

N84-30993# GA Technologies, Inc., San Diego, Calif.

DENSITY VARIATION DUE TO WAVE HEATING IN TOKAMAK PLASMAS

J. Y. Hsu, V. S. Chan, R. W. Harvey, F. L. Hinton, R. Prater, and S. K. Wong Mar. 1984 6 p refs Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. - 3 Jul. 1984
(Contract DE-AT03-84ER-53158)
(DE84-009402; GA-A-17386; CONF-840616-2) Avail: NTIS HC A02/MF A01

The Tokamak plasma density was observed to drop during electron cyclotron resonance heating (ECRH), and to increase during ion cyclotron resonance frequency heating (ICRF) and LHH. A mechanism is proposed herein to explain these density variations. Depending on the nature of the specific wave heating, electrons or ions tend to pile up toward the weak field side. A poloidally varying electrostatic potential is expected to arise and to saturate at a level such as to balance the trapping effect due to the magnetic well and the radio frequency heating. As a result, a E x B drift comparable to the ion vertical drift in a toroidal magnetic field may occur. Assuming that electrons move across the magnetic surfaces more freely due to the magnetic stochasticity or other turbulent diffusion mechanisms, and the particle confinement is primarily determined by the ion neoclassical transport rate, the ECRH enhances the ion vertical drift and causes the density of drop, while the ICRF and LHH reduce the ion vertical drift and improve the density confinement. DOE

N84-30994# New York Univ., New York. Inst. of Mathematical Sciences.

MAGNETOHYDRODYNAMIC EQUILIBRIUM AND STABILITY OF STELLARATORS

Frances Bauer, Octavio Betancourt, and Paul Garabedian 1984 201 p refs
(Contract DE-AC02-76ER-03077)
(DE84-010731; DOE/ER-03077/T1; ISBN-0-387-90966-4; ISBN-3-540-90966-4) Copyright. Avail: NTIS HC A10/MF A01

A numerical method to study plasma confinement in a strong magnetic field is detailed. The emphasis is on confinement in toroidal geometry without two-dimensional symmetry. The mathematical model employed in the investigation is based on the prtial differential equations of ideal magnetohydrodynamics. The principal application is to stellarators, currently important in the development of controlled thermonuclear fusion. The BETA computer code, along with a sample run, is included. DOE

N84-30995# Naval Research Lab., Washington, D. C. Center for Space Research.
MEASUREMENTS OF SPATIALLY RESOLVED HIGH RESOLUTION SPECTRA OF LASER-PRODUCED PLASMAS Annual Report
U. Feldman 1984 10 p
(Contract DE-AI08-79DP-40092)
(DE84-012418; DOE/DP-40092/4) Avail: NTIS HC A02/MF A01

A high resolution grazing incidence spectrograph, provided by the Naval Research Laboratory and the Goddard Space Flight Center, was installed on the Omega laser facility of the Laboratory for Laser Energetics (LLE) at the University of Rochester. This 3 meter instrument, with a 1200 lines/mm grating blazed at 2(0) 35', has produced extremely high quality spectra in the wavelength region 10 A to 100 A. Spectra were obtained from glass microballoon targets that are coated with a variety of high-Z materials. Transitions from the Na-like ionization stages of Fe, Ni, Cu, and Kr were identified. DOE

N84-30996# Georgia Inst. of Tech., Atlanta.
ROTATION AND IMPURITY TRANSPORT IN A TOKAMAK PLASMA WITH DIRECTED NEUTRAL BEAM INJECTION
W. M. Stacey, Jr. and D. J. Sigmar (ORNL, Tenn.) Feb. 1984 32 p refs
(Contract DE-AS05-78ET-52025)
(DE84-008014; GTFR-47) Avail: NTIS HC A03/MF A01

Collisional regime theory for rotation and impurity transport in a Tokamak plasma with strong, directed Neutral Beam Injection (NBI) and strong rotation (v/sub phi/ approx. v/sub th/) is extended to the plateau regime. A kinetic theory derivation of the parallel viscous force in the strong rotation ordering and a self consistent formalism for calculating ion and impurity rotation velocities and radial transport fluxes is presented, as well as the radial electric field and the poloidal variation of the impurity density upon which the former strongly depend. Calculations for model problems representative of ISX-B and PLT are presented. The predicted impurity transport features are in agreement with experimental observations. DOE

N84-30997# Sandia Labs., Albuquerque, N. Mex.
ENERGY-RESOLVING CARBON RESISTANCE PROBES FOR PLASMA EDGE CHARACTERIZATION
W. R. Wampler May 1984 13 p refs Presented at the 6th Intern. Conf. on Plasma Surface Interactions in Controlled Fusion Devices, Nagoya, 14 May 1984
(Contract DE-AC04-76DP-00789)
(DE84-012235; SAND-83-2641C; CONF-840520-4) Avail: NTIS HC A02/MF A01

The resistance increase in thin carbon films caused by energetic particle bombardment was developed into the carbon resistance probe, to measure the energy and flux of particles at the edge of a plasma. This probe was calibrated by ion implantation of hydrogen and deuterium with energies from 20 to 1600 eV. Sensitivity to particles with energies as low as 30 eV was demonstrated. Calibrations are also presented for thin-layer resistance probes, a configuration in which energy resolution is obtained using carbon films and ranging overlayers comparable in thickness to the range of the particles. The results show that thin-layer probes can be used to measure the particle energies and fluxes typically encountered at the first wall of a Tokamak. DOE

N84-30998# Wisconsin Univ., Madison. Dept. of Physics.
EXPERIMENTAL OBSERVATION OF THE SHEAR ALFVEN RESONANCE IN A TOKAMAK
F. D. Witherspoon, S. C. Prager, and J. C. Sprott May 1984 18 p refs
(Contract DE-AC02-78ET-53051)
(DE84-012993; DOE/ET-53051/66) Avail: NTIS HC A02/MF A01

Experiments in Tokapole 2 demonstrate the shear Alfven resonance in a Tokamak by direct probe measurement of the wave magnetic field within the plasma. The resonance is driven by external antennas and is identified as radially localized enhancements of the poloidal wave magnetic field. The radial location agrees with calculations which include toroidicity and noncircularity of the plasma cross-section. Other properties such as polarization, radial width, risetime, and wave enhancement also agree with MHD theory. DOE

N84-30999# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
RF-INDUCED STABILITY AND TRANSPORT IN AXISYMMETRIC TANDEM MIRRORS
J. R. Myra and D. A. Dippolito Apr. 1984 9 p refs
(Contract DE-AC03-76ET-53057)
(DE84-010842; SAI-84-3033/PRI-77) Avail: NTIS HC A02/MF A01

A kinetic theory of the ponderomotive was force on a plasma due to an electromagnetic ion cyclotron wave was developed and applied to axisymmetric mirrors. The force due to nonresonant particles is shown to modify the usual magnetohydrodynamic interchange stability criterion. Resonant particle contributions to the force arise from the absorption of photon momentum and spin. This effect drives a radial particle flux, modifies the radial ambipolar potential profile, and couples transport and stability. DOE

N84-31000# Rochester Univ., N. Y. Lab. for Laser Energetics.
NONLOCAL HEAT TRANSPORT BY NON-MAXWELLIAN ELECTRONS
K. Swartz and R. W. Short 30 Mar. 1984 8 p Presented at the Anomalous Absorption Conf., Charlottesville, 6-11 May 1984
(Contract DE-AC08-80DP-40124)
(DE84-012391; DOE/DP-40124/38; CONF-8405163-2) Avail: NTIS HC A02/MF A01

The generalization of the Spitzer-Harm solution to steep density and temperature gradients requires the computation of the appropriate non-Maxwellian isotropic part of the electron distribution. Analytic solutions for a steady state, high-Z plasma were developed employing the diffusion approximation. Applications of these solutions include computation of the resulting heat flux, thermal smoothing of transverse temperature perturbations, and modification of linear heat flow instabilities. DOE

N84-31001# Rochester Univ., N. Y. Lab. for Laser Energetics.
OBSERVATION OF SCATTERED LIGHT BETWEEN OMEGA-2 AND 3/2-OMEGA IN SHORT WAVELENGTH LASER PRODUCED PLASMAS
L. M. Goldman, W. Seka, K. Tanaka, A. Simon, and R. Short 1984 15 p Presented at the Anomalous Absorption Conf., Charlottesville, 6-11 May 1984
(Contract DE-AC08-80DP-40124)
(DE84-012533; DOE/DP-40124/32; CONF-8405163-3) Avail: NTIS HC A02/MF A01

Extensive measurements were carried out on scattered radiation in the spectral region between omega/2 and 3/2 omega from plasmas produced by 351 nm lasers. The relative intensities of the continuum radiation relative to the line features at omega/2 and 3/2 omega are shown. A spectral feature was observed between 3/2 omega and omega which may be an upscattered component produced by ordinary Raman scattering. The overall experimental evidence for ordinary Raman scattering compared with stimulated Raman scattering is discussed. DOE

N84-31002# City Univ. of New York, N. Y.
NON-GEOMETRICAL OPTICS INVESTIGATION OF MODE CONVERSION IN WEAKLY RELATIVISTIC INHOMOGENEOUS PLASMAS Annual Progress Report, 14 Sep. 1983 - 14 May 1984
Kaya Imre May 1984 7 p refs
(Contract DE-AC02-83ER-53162)
(DE84-012396; DOE/ER-53162/3) Avail: NTIS HC A02/MF A01

The coupling of the extraordinary and the quasi-electrostatic modes at the second electron cyclotron resonance for a weakly relativistic plasma was investigated in order to evaluate the effectiveness of the electron cyclotron resonance heating mechanism to pre-heat the plasma. When the propagation is nearly perpendicular to the external magnetic field, and the plasma density is sufficiently high a strong coupling exists between these waves. In a critical interval of density the geometrical optics model predicts a 100% mode conversion for waves crossing the resonance layer. It is shown that this model fails within a small boundary layer near the resonance, thus requiring a full-wave analysis in this region. The linearized relativistic Vlasov equation was solved in the inner region, and field equations valid within the boundary layer were derived. The outer region was treated using the standard geometrical optics method. The inner solution were matched to the outer solutions in the usual manner. Appropriate energy flux theorems were derived so that the energy associated with the wave and the particles are distinguishable. DOE

N84-31003# Texas Univ., Austin. Inst. for Fusion Studies.
INTERACTION OF THE PRECESSIONAL WAVE WITH FREE-BOUNDARY ALFVEN SURFACE WAVES IN TANDEM MIRRORS
Herbert L. Berk and Thomas B. Kaiser (California Univ., Lawrence Livermore Lab., California) Apr. 1984 29 p refs
(Contract DE-FG05-80ET-53088)
(DE84-012527; DOE/ET-53088/132) Avail: NTIS HC A03/MF A01

A symmetric tandem mirror plugging a long central cell, with plugs stabilized by a hot component plasma was considered. The system was assumed to have a flat pressure profile with a steep edge gradient. The interaction of the precessional mode with Alfven waves generated in the central cell was also considered. The analysis was non-eikonal and was valid when m(DELTA)/r 1 (m is the azimuthal mode number, r the plasma radius, and (DELTA) the radial gradient scale length for long-wavelength radial modes. Without finite-Larmor-radius (FLR) effects, the precessional mode is always destabilized by the excitation of the Alfven waves for m greater than or equal to 2. For M=1, it is possible to achieve stabilization with conducting walls. The effect of FLR on stabilization of the m greater than or equal to 2 long-wavelength modes is discussed along with finite-Larmor-radius stabilization of modes described in the eikonal approximation. DOE

N84-31004# California Univ., Los Angeles. Dept. of Electrical Engineering.
STUDIES OF CO2 LASER INTERACTIONS WITH PLASMA Final Report, 1 Jan. 1981 - 30 Mar. 1983
Francis F. Chen and Chan Joshi Dec. 1983 25 p
(Contract DE-AS08-81DP-40135)
(DE84-012485; DOE/DP-40135/1) Avail: NTIS HC A02/MF A01

Results are reported on: (1) detection of ion waves in SBS by Thomson scattering, (2) explanation of SBS saturation by ion trapping, (3) interaction of SBS and SRC (theory), (4) detection of SRS and explanation of threshold, (5) excitation of plasma waves by optical mixing, (6) use of Stark satellites as a new diagnostic, and (7) observation of Rayleigh-Taylor instabilities in a theta pinch. Progress is reported on high-density experiments employing a solid target. DOE

N84-31005# Rochester Univ., N. Y. Lab. for Laser Energetics.
A NEW MODEL OF RAMAN SPECTRA IN LASER PRODUCED PLASMA
Albert Simon and Robert W. Short 30 Mar. 1984 17 p
(Contract DE-AC08-80DP-40124)
(DE84-012487; DOE/DP-40124/34; CONF-8405163-5) Avail: NTIS HC A02/MF A01

Some experimental observations of Raman scattering in laser produced plasma were attributed to the onset of the convective Stimulated Raman Instability (SRS-C). This interpretation has had a number of difficulties, associated with the calculated threshold for onset of the SRS-C, the existence of gaps in the frequency spectrum near the incident frequency (LC OMEGA)0 and near (LC OMEGA)0/2, and with the angular distribution. A new explanation based on ordinary incoherent Thomson scattering, with a greatly enhanced plasma line is proposed. Transient local reversed-slope velocity distributions in the underdense region can be produced by pulses of hot electrons arising from the two-plasmon (2(LC OMEGA)/sub p/) or absolute stimulated Raman instabilities (SRS-A) occurring near the quarter critical surface. A simple model yields the observed spectral gaps near (LC OMEGA)0 and near (LC OMEGA)0/2. The correlation of onset of this scattering with onset of the SRS-A, its transient localization in frequency and time, and the weak azimuthal angular variation are also explained. The existence of upscattered light is also predicted. DOE

N84-31006# Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
THE USE OF ISOTOPICALLY-ENRICHED CARBON PROBES FOR EROSION DEPOSITION MEASUREMENTS IN THE ASDEX DIVERTOR
J. B. Roberto, J. Roth, E. Taglauer (ORNL), and O. W. Holland 1984 16 p refs Presented at the 6th Intern. Conf. on Plasma Surface Interactions in Controlled Fusion Devices, Nagoya, 14 May 1984 Submitted for publication
(Contract DE-AC05-84CR-21400)
(DE84-012329; CONF-840520-3) Avail: NTIS HC A02/MF A01

An isotopic marker technique was developed and used to a measure near-surface erosion and carbon and impurity deposition on graphite samples in the ASDEX divertor chamber. Papyex graphite strips were enriched to approx. 20% C(13) over the first 1000 A by ion implantation. The implanted C(13) can be clearly distinguished from C(12) of the host by Rutherford backscattering using 2.7 MeV He(4). Carbon erosion and deposition were determined from changes in the depth distribution of the C(13), and impurity accumulation was also monitored in the backscattering spectrum. The C(13) profiles were also monitored in the backscattering spectrum. The C(13) profiles remained sharp in spite of high heat fluxes to the samples (sufficient to melt stainless steel), and the results showed clear evidence of simultaneous erosion and deposition of carbon and impurities. During 2.4 MW neutral injection, net carbon erosion exceeded 250 A/s in the divertor throat. High carbon erosion was also observed during periods of substantial Fe and Ti impurity accumulation on the samples. The results demonstrate the applicability of the C(13) technique for measuring erosion/deposition at high-heat-flux surfaces such as limiters or divertor plates. DOE

N84-30877# Joint Publications Research Service, Arlington, Va.
PLASMA IN DIVERTER DURING INTENSE RECYCLING Abstract Only
A. V. Nedospasov and M. Z. Tokar *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 14 refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 270, no. 6, Jun. 1983 p 1376-1380 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30878# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF PLASMA CORONA ON SPHERICAL TARGETS IRRADIATED BY LASER Abstract Only
Yu. A. Zakharenkov, N. N. Zorev, A. A. Rupasov, G. V. Sklizkov, and A. S. Shikanov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 15 Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzaimodeystviye Lazernogo Izlucheniya S Termoyadernymi Mishenyami (Moscow), v. 133, 1983 p 146-188 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30881# Joint Publications Research Service, Arlington, Va.
STUDIES OF AMPLIFIER MODULE IN DELFIN FACILITY FOR HEATING THERMONUCLEAR PLASMA Abstract Only
N. G. Basov, B. L. Vasin, A. A. Galichiy, A. Ye. Danilov, B. Yu. Ivanov, M. P. Kalashnikov, B. V. Kruglov, Yu. A. Mikhaylov, and V. P. Osetrov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 18 refs Transl. into ENGLISH from Tr. Ordena Lenina Fiz. Inst. Imeni P. N. Lebedeva Akad. Nauk SSSR: Vzaimodeystviye Lazernogo Izlucheniya s Termoyaderymi Mi-

shenyami (Moscow), v. 133, 1983 p 3-18 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N84-31007# Sandia Labs., Albuquerque, N. Mex.
STRAINED LAYER SUPERLATTICE MATERIALS FOR MILLIMETER WAVE FET'S, PHASE 1 Final Report
R. J. Chaffin, ed. Feb. 1984 55 p refs
(Contract DE-AC04-76DP-00789)
(DE84-011475; SAND-84-0477) Avail: NTIS HC A04/MF A01

Goal was the development of a semiconductor material with a superior velocity - field characteristic for use in mm wave FET's. Research was directed at increasing the saturated drift velocity and suppressing the Gunn effect by Band Structure Engineering using Strained Layer Superlattices (SLS's). The program covered theoretical analysis, crystal growth, X-ray and transport measurements and fabrication of FET's. Results were obtained on GaAs/InO 8As superlattices with layer thicknesses from 45 to 300 A. Measurements have shown that the material quality of this SLS is extremely high even though the active regions contain up to 100 interfaces with built in strains due to the 1.4% lattice mismatch between GaAs and InO 2GaO 8As. This quality manifests itself in low temperature Modulation Doped (M.D.) electron mobilities equal to or greater than those of lattice matched AlGaAs M.B. superlattices. Room temperature electron mobilities in our three dimensional SLS's are comparable to those seen in two dimensional HEMT (High Electron Mobility Transistors) or MODFET's (Modulation Doped FET's). DOE

N84-31008# Institute of Space and Astronautical Science, Tokyo (Japan).
EXPERIMENTAL STUDY ON POROUS-PLUG PHASE SEPARATOR FOR SUPERFLUID He2
Masahide Murakami, Noriyuki Nakaniwa, Hirotaka Nakai, and Kiichiro Yuama Jun. 1984 38 p refs
(ISAS-612; ISSN-0285-6808) Avail: NTIS HC A03/MF A01

Superfluid liquid helium 2 was requested for cooling of such spaceborne instruments as infrared detectors down to absolute zero. A phase separator composes of a crucial part of such cryogenic systems to allow the liquid phase to be separated from the vapor in order to safely contain He2 in containers in the zero-gravity state. Porous-plugs were fabricated and tested to understand the basic flow characteristics through porous-plugs both in the laboratory and in the zero-gravity state aboard a rocket. Results show that the phase separation and the cooling power control were satisfactorily performed in both situations. The fundamental feature of the flow phenomena through porous-plugs is made clear quantitatively as well as qualitatively to provide sufficient data for the practical design of porous-plugs for potential spaceborne IR telescope systems. Author

N84-31009# Naval Postgraduate School, Monterey, Calif.
COMPUTER SIMULATION STUDIES OF SPUTTERING AND MULTIMER FORMATION FROM CLEAN AND OXYGEN REACTED SURFACES OF TITANIUM, VANADIUM AND NIOBIUM M.S. Thesis
M. G. Mathis Dec. 1983 221 p
(AD-A141998) Avail: NTIS HC A10/MF A01 CSCL 20/12

The NPS computer simulation model was used to investigate the sputtering by 1.0 keV argon bombardment of celan and oxygen reacted monocrystalline titanium, vanadium and niobium. Variations in yield, energy and angular distributions and in particular, multimer formation, were studied as a function of oxygen density and location. Simulation results show a significant decline in substrate yield as the oxygen coverage is increased, regardless of location. Further, there is a marked preference for multimer formation by lattice fragmentation, rather than by recombination, for all three metals. The percentages of multimers formed by fragmentation were found to increase with increasing oxygen density for all three metals. Previous results on face-centered cubic crystals concerning the yield per layer and the effects of channeling were confirmed for body-centered cubic and hexagonal closed-packed crystals. For comparison, simulation runs were repeated at ion energies of 0.5 and 2.0 keV for a titanium with oxygen atoms located in three-fold sites with a C(2x2) density. Author (GRA)

N84-31010# Santa Barbara Research Center, Goleta, Calif.
HgCdTe SURFACE AND DEFECT STUDY PROGRAM Interim Technical Report
Jerry A. Wilson, Joel A. Silberman (Stanford Univ., Calif.), S. Cole (Stanford Univ., Calif.), W. E. Spicer (Stanford Univ., Calif.), D. Laser (Stanford Univ., Calif.), A. Sher (SRI International, Menlo Park, Calif.), and R. G. Wilson (Hughes Research Labs., Malibu, Calif.) Jul. 1983 157 p Prepared in cooperation with Stanford Electronics Labs., Calif., SRI International, Menlo Park, Calif. and Hughes Research Labs., Malibu, Calif.
(Contract MDA903-83-C-0108)
(AD-A142342; SBRC-40497; Rept-0002AC) Avail: NTIS HC A08/MF A01 CSCL 20/12

This report presents results of the first six-months period of a three-year study of the surface and defects of HgCdTe. In an investigation of MIS interfaces using Photox SiO2 on HgCdTe, effects of the choice of gate metal composition are presented. Contribution to flatband bias, measured by capacitance voltage, of insulator fixed charge is determined. Effect of water on interface electrical and mechanical properties are presented. Studies of the initial stages of oxidation of UHV cleaned HgCdTe using photoemission spectroscopy are presented. The effect of Hg bonding on ease of defect formation is discussed and using TEM, defects in bulk and LPE grown material are surveyed. Detailed calculations of s, p and hybrid (sp3) energies are presented for Hg, Cd, Zn, Te, Se, and S. Bond energies of pure binaries and in the alloy are calculated. Trends are interpreted to show replacement of Cd by Zn stabilizing the alloy. GRA

N84-31011# Stanford Univ., Calif. Lab. of Physics.
ELASTIC DOMAIN WALL WAVES IN FERROELECTRIC CERAMICS AND SINGLE CRYSTALS Annual Progress Report, 1 Feb. 1983 - 31 Jan. 1984
B. A. Auld Apr. 1984 42 p
(Contract N00014-79-C-0222)
(AD-A142393; SU-GL-3716) Avail: NTIS HC A03/MF A01 CSCL 20/2

More detailed measurements have been made on the resonance mode structure of PZT-composite plate transducers. These are compared with constant strain and constant stress versions of Floquet (space harmonic) theory, with good agreement. Quantitative measurement procedures for measuring bulk wave and surface wave coupling in PMN are being developed. The dependence of poled interface waveguide characteristics on fabrication parameters have been measured, and interface directional couplers have been realized. Author (GRA)

N84-31012# Illinois Univ., Urbana. Coordinated Science Lab.
DIFFUSION AND ELECTRICAL PROPERTIES OF SULFUR IMPLANTED IN GALLIUM ARSENIDE Ph.D. Thesis
S. S. Chan Jul. 1983 94 p
(Contracts N00014-79-C-0424; N00014-76-C-0806)
(AD-A142405; R-992; UILU-ENG-83-2213) Avail: NTIS HC A05/MF A01 CSCL 20/12

As the need for high speed devices and circuits continues to grow, GaAs has received increasing attention as a viable (both technologically and economically) electronic material complementary to Si. The advantages of GaAs lie in its much higher electron mobility and its compatibility with optoelectronic devices. The merits of a planar process have been well demonstrated in Si technology, and in the course of the development of a similar process for GaAs, ion implantation has emerged as an indispensable tool. Ion implantation is inherently a much more precise and controllable method of selective semiconductor doping than diffusion. To attain the degree of line-width control necessary for high speed or high density devices, ion implantation is a prerequisite. Besides, many useful dopants in GaAs cannot be introduced readily by diffusion because of material constraints. In spite of its importance in the fabrication of devices which take advantage of the high electron mobility of GaAs, donor implantation in GaAs has not found as much success as acceptor implantations. In order to avoid amphoteric tendencies and possible self-compensation mechanisms, it is generally best to use a column VI element. GRA

N84-31013# Rome Air Development Center, Griffiss AFB, N.Y.
STATIC FREQUENCY-TEMPERATURE CHARACTERISTICS OF DOUBLY ROTATED QUARTZ Technical Report, Jul. 1982 - Aug. 1983
A. Kahan Dec. 1983 43 p
(AF Proj. 2305)
(AD-A142456; RADC-TR-83-285) Avail: NTIS HC A03/MF A01 CSCL 20/2

The static frequency characteristics of crystallographically doubly rotated quartz as a function of temperature, f(T), are described. Curves showing the sensitivity of the normalized frequency offset to small misorientations in angle are developed. Three different sets of currently accepted temperature coefficients of elastic constants are applied to calculate f(T). We show that for specific orientations of practical interest, the three sets predict significant differences in the inflection and turnover temperatures. The crystallographic orientations showing this angular sensitivity are the ones to be exploited experimentally to establish the regions in which the different sets are valid. Detailed computations are performed for orientations yielding 80 C turnover temperatures and for the SC-cut. Author (GRA)

N84-31014# Old Dominion Univ., Norfolk, Va. Dept. of Physics.
FEASIBILITY STUDIES OF CONVERSION ELECTRON MOESSBAUER SPECTROSCOPY (CEMS) OF IRON-DOPED InP Final Technical Report, 1 Dec. 1983 - 30 Apr. 1984
G. R. Hoy, D. C. Cook, and E. Agyekum May 1984 33 p
(Contract N00014-83-K-2018)
(AD-A142463) Avail: NTIS HC A03/MF A01 CSCL 07/4

An electron detector for conversion electron Moessbauer spectroscopy (CEMS) has been designed and built. Tests have been performed to study the effects on the detector resolution with respect to high voltage, gas flow rate, and counting rate. These parameters have been optimized to detect the 7.3keV conversion electrons emitted following resonant absorption of the 14.4keV source gamma rays associated with the Moessbauer effect using Fe57. CEMS spectra have been obtained using standard Fe57 enriched and natural iron samples. CEMS spectra have also been obtained for InP:Fe samples supplied by the Naval Research Laboratory. So far we have only been successful in observing the iron in the precipitates in these samples. Our tentative conclusions are that the precipitate regions contain a FeP2 component and perhaps regions of pure iron. We intend to study the precipitates further. Since our preliminary work has been completed, we now plan to make extensive tests to determine whether or not the CEMS technique can detect the substitutional iron in InP:Fe samples. Author (GRA)

N84-31015# Harry Diamond Labs., Adelphi, Md.
RARE-EARTH ION-HOST LATTICE INTERACTIONS: 15. ANALYSIS OF THE SPECTRA OF Nd3+ IN Gd3Sc2Ga3O12
C. A. Morrison, R. P. Leavitt, and M. D. Gildner May 1984 26 p
Sponsored by Army
(AD-A142555; HDL-TR-2035) Avail: NTIS HC A03/MF A01 CSCL 07/4

The Judd-Ofelt theory of induced electric-dipole transitions is used to calculate multiplet-to-multiplet line strengths, lifetimes, and branching ratios, and line-to-line squared matrix elements between all the energy levels considered for the triply ionized lanthanides Ce3+ through Yb3+ in Gd3Sc2Ga3O12. Magnetic-dipole transitions are also calculated. The even-n Bnm used in the calculations are obtained by smoothing the phenomenological Bnm obtained by fitting experimental data on neodymium. The odd-n Anm are obtained from appropriate lattice sums. These results are compared with neodymium in several popular host materials. Detailed intensity calculations (line to line) and g-factor calculations have been performed and the results are attached in microfiche form. Author (GRA)

N84-31016# National Bureau of Standards, Washington, D.C. Center for Electronics and Electrical Engineering.
MEASUREMENT TECHNIQUES FOR HIGH-POWER SEMICONDUCTOR MATERIALS AND DEVICES Annual Report, 1 Jan. 1982 - 31 Mar. 1983
W. R. Thurber, J. R. Lowney, and W. E. Phillips Apr. 1984 51 p refs
(Contract DE-AI01-76PR-06010)
(DE84-010425; NBSIR-84-2838) Avail: NTIS HC A04/MF A01

Procedures for the effective utilization of deep-level measurements to detect and characterize defects which reduce lifetime or contribute to leakage current in power-device-grade silicon are described. The computer program for predicting excess-carrier lifetime is revised to calculate more accurately lifetimes for high or low injection conditions and in space charge regions. Comparisons are made between lifetime measurements on platinum doped silicon diodes and the predictions of the computer model. As part of the effort to extend the procedures to analyze data from nonexponential transient capacitance measurements, the time dependence of the capacitance-voltage relationship of a heavily platinum-doped silicon diode is measured as a function of bias voltage. DOE

N84-31017# Sandia Labs., Albuquerque, N. Mex.
TRANSIENT RESPONSE OF GaAs MICROWAVE POWER FET TO X-RAY PULSES
M. G. Armendariz and J. G. Castle, Jr. Apr. 1984 9 p refs
Presented at the Intern. Conf. on Plasma Phys., Lausanne, Switzerland, 27 Jun. 1984
(Contract DE-AC04-76DP-00789)
(DE84-010145; SAND-84-0406C; CONF-840616-7) Avail: NTIS HC A02/MF A01

Gallium arsenides MESFETs, constructed with a 2 micron high mobility low conductivity VPE buffer layer, were exposed at room temperature to the X-ray pulse from a FEBETRON 705 source up to dose rates of 9 x 10(10) rad(Si)/s. Upset of the 2-GHz output signal and its recovery time depended on how well the nominal 50 ohm test circuit lines were matched to 50 ohms. Strong increases in Ids usually showed a ten percent tail which always disappeared in microseconds. Evidence for a backgating effect was not found. No primary photocurrents could be identified. DOE

N84-31018# California Univ., Livermore. Lawrence Livermore Lab.
DEFECT PRODUCTION EFFICIENCIES IN THERMAL NEUTRON IRRADIATED COPPER AND MOLYBDENUM
J. H. Kinney, M. W. Guinan, and Z. A. Munir (California Univ., Davis) 24 Apr. 1984 6 p refs Presented at 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983 Submitted for publication
(Contract W-7405-eng-48)
(DE84-010993; UCRL-89002; CONF-830942-85) Avail: NTIS HC A02/MF A01

The primary recoil spectra for thermal neutron capture in copper and molybdenum was derived and the damage energy cross-sections needed to determine the defect production efficiencies from measured resistivity damage rates were calculated. These efficiencies, which are in excellent agreement with fully dynamic computer simulations of collision cascades, are compared to the predictions of displacement functions which are currently in use. DOE

N84-31019# Department of Energy, Washington, D. C.
SILICON CRYSTAL GROWING BY OSCILLATING CRUCIBLE TECHNIQUE Patent Application
Guenter H. Schwuttke, K. M. Kim, and P. Smetana, inventors (to DOE) Filed 3 Aug. 1983 14 p
(Contract DE-AI01-76ET-20356)
(DE84-011038; US-Patent-Appl-SN-521497) Avail: NTIS HC A02/MF A01

A process for growing silicon crystals from a molten melt comprising an oscillating crucible during crystal growth is disclosed. DOE

N84-31020# Polytechnic Inst. of New York, Brooklyn. Dept. of Physics.
PHOTOEMISSION STUDIES OF MIXED VALENT SYSTEMS
R. D. Parks, S. Raaen (Brookhaven National Lab., Upton, N.Y.), M. L. denBoer, and G. P. Williams (Brookhaven National Lab., Upton, N.Y.) 1984 23 p refs Presented at the Workshop on High Energy Excitations in Condensed Matter, Las Alamos, N. Mex., 13 Feb. 1984
(Contract DE-AC02-76CH-00016)
(DE84-010797; BNL-34604; CONF-840264-5) Avail: NTIS HC A02/MF A01

Photoemission spectroscopy was used to study a number of aspects of the mixed valent state (corresponding to non-integral 4f occupation) in rare earth systems. Deep core photoemission (e.g., from 3d or 4d levels) allows the measurement of the 4f occupancy and surface valence shifts, and, as well, the indirect measurement of the effect of solid state environment on the energy of hybridization between 4f electrons and conduction electrons. 4f-Derived photoemission was used to study surface valence and chemical shifts and to infer the nature of the mixed valent ground state. A combination of 4f-derived photoemission and add-electron spectroscopy provides a measurement of the 4f Coulomb correlation energy, an important parameter in the mixed valent problem. A review of these approaches is presented, with emphasis on Ce-based systems, whose behavior falls outside the usual description of 4f-unstable systems. DOE

N84-31021# California Univ., Berkeley.
GROWTH AND CHARACTERIZATION OF METAL OXIDE WHISKERS FOR AEROSOL FILTRATION
James Matthew Brewer 6 Jul. 1984 141 p refs
(Contract W-7405-eng-48; Grant NSF CEP-81-03635)
(DE84-011049; UCRL-15599) Avail: NTIS HC A07/MF A01

When grown on a phosphor bronze screen, copper oxide whiskers enhance the capture efficiency due to inertial impaction by orders of magnitude, particularly for small aerosols (D/sub p/ approx. = 1.0 (MU)m) at low flow rates (U approx. = 1.0 m/s). The increased pressure drop is small and most of it is due to the oxide layer. Impaction efficiencies for the unoxidized screens were correlated with an adjusted Stokes number which employed a hydrodynamic factor. The hydrodynamic factor accounted for the Reynolds number dependence and the dependence on the solids fraction. The boundary layer theory was used to predict the Reynolds number dependence and Kuwabara's flow cell model to correct for the influence of neighboring wires on the flow field. The adjusted Stokes number was not needed to correlate the results for the oxidized screens. Impaction efficiencies correlated well with the unadjusted Stokes number. The addition of the copper oxide whiskers on the collector surface increased the drag such that the influence of the fluid inertia was not important for the conditions investigated. The added whiskers created a zone of capture which enhanced filtration efficiencies orders of magnitude. Author

N84-31022# Wyoming Univ., Laramie. Dept. of Chemistry.
SOLID SURFACE LUMINESCENCE ANALYSIS Progress Report, Nov. 1982 - Mar. 1984
Robert J. Hurtubise Apr. 1984 6 p refs
(Contract DE-AC02-80ER-10624)
(DE84-011254; DOE/ER-10624/4) Avail: NTIS HC A02/MF A01

Several advances were made in understanding the interactions responsible for room-temperature phosphorescence. Infrared data showed strong room-temperature phosphorescence from compounds adsorbed on some surfaces which contained adsorbed water. A partial model for phosphor/solid-surface interactions was developed for nitrogen heterocycles and polycyclic aromatic hydrocarbons adsorbed on poly(acrylic acid)-salt mixtures. Hydroxyl aromatics behave as hydrogen donors, hydrogen accepting species, or as both hydrogen donors and hydrogen acceptors when adsorbed on solid-surfaces. Several new analytical methods and techniques were developed. Poly(acrylic acid)-phosphor solutions that were spotted on filter paper resulted in lower limits of detection and better reproducibility. Both qualitative and quantitative analysis of mixtures were achieved at the nanogram level by using room-temperature fluorescence and phosphorescence. In addition, the combined use of zeroth and second derivative room-temperature fluorescence and phosphorescence spectra was developed into a useful analytical approach. DOE

N84-31023# California Univ., Livermore. Lawrence Livermore Lab.
FRACTIONAL QUANTIZATION OF THE HALL EFFECT
R. B. Laughlin 27 Feb. 1984 13 p refs Presented at the 3rd Intern. Winterschool on New Develop. in Solid State Phys., Salzburg, 26 Feb. - 2 Mar. 1984
(Contract W-7405-eng-48)
(DE84-008894; UCRL-89743-Rev-1; CONF-840284-1-Rev-1) Avail: NTIS HC A02/MF A01

The Fractional Quantum Hall Effect is caused by the condensation of a two-dimensional electron gas in a strong magnetic field into a new type of macroscopic ground state, the elementary excitations of which are fermions of charge 1/m, where m is an odd integer. A mathematical description is presented. DOE

N84-31024# Cornell Univ., Ithaca, N.Y. Dept. of Physics.
SIMULATION OF ULTRA-LOW EMITTANCE ELECTRON STORAGE RINGS Progress Report
Louis N. Hand 18 May 1984 22 p refs
(Contract DE-AC02-83ER-40089)
(DE84-012050; DOE/ER-40089/1) Avail: NTIS HC A02/MF A01

During a visit to the Soviet Union a lecture on the future of high energy physics was delivered at three institutes, two in Moscow and one in Novosibirsk. The overall future development of high energy physics was reviewed in the light of the then current extreme pessimism about achieving meaningful scientific results at energies an order of magnitude above those currently available. There was little actual basis for pessimism but that considerable theoretical and experimental work needed to be done over the next 20 to 30 years to prevent a scientific crisis from occurring at that time. The need for more options and relatively straightforward nature of the extrapolation to large proton accelerators such as the SSC led to the conclusion that the alternative of a large (1 TeV) electron linear collider as a possible future option should be explored as well. The rest of this work, (which was accepted for publication in Particle Accelerators) concentrated on the fundamental limitations which might prevent us from achieving such an accelerator, i.e., those limits which are of a general and fundamental character and are independent of additional limitations arising from a specific technology. DOE

N84-31025# Argonne National Lab., Ill. Materials Science and Technology Div.
CATION SELF-DIFFUSION IN Fe2O3
K. Hoshino and N. L. Peterson 1984 6 p refs Submitted for publication
(Contract W-31-109-eng-38)
(DE84-009152; CONF-840664-5) Avail: NTIS HC A02/MF A01

Self-diffusion of Fe(59) in single crystals of Fe2O3 parallel to the c-axis has been measured as a function of temperature (1150 to 1340 C) and oxygen partial pressure 0.002 less than or equal to Po2 less than or equal to 1 atm). The oxygen partial pressure dependence of the diffusivity indicates that cation self-diffusion occurs by an interstitial-type mechanism. The simultaneous diffusion of Fe(52) and Fe(59) was measured in Fe2O3 at 1251 C and Po2 = .0191 atm. The small value of the isotope effect (f(DELTA)K = 0.067 + or - 0.016) is consistent with diffusion of Fe ions by an interstitially mechanism. DOE

N84-31026# Delaware Univ., Newark. Inst. of Energy Conversion.
CHEMICAL VAPOR DEPOSITION OF AMORPHOUS SEMICONDUCTOR FILMS Semiannual Report, 1 May 1983 - 31 Oct. 1984
Mar. 1984 86 p refs
(Contract DE-AC02-83CH-10093)
(DE84-004489; SERI/STR-211-2230) Avail: NTIS HC A05/MF A01

An analysis of intrinsic and phosphorus-doped n-type amorphous silicon films deposited by LPCVD from disilane in a laminar flow tubular reactor is presented. These films were analyzed using SIMs, ESR measurements, optical absorption, and conductivity in light and dark. CVD deposited i layers were used to make platinum Schottky barrier devices and hybrid cells utilizing glow discharge deposited layers in both the ITO/nip/Mo and ITO/pin/Mo configurations. The highest efficiency of hybrid cells with the ITO/ni/(CVD)/p (GD)/Mo structure was approximately 1.5%. The highest efficiencies were obtained with thin i layers. The highest efficiency for the ITO/p(GD)/in(CVD)/Mo configuration was 4.0%. A chemical model was developed describing the gas phase reactions and film growth; the model quantitatively describes the effluent composition when the measured growth rate is input. Kinetic rate expressions and constants for growth from higher silanes are being determined for a wide range of reaction conditions. DOE

N84-31027# Utah Univ., Salt Lake City. Dept. of Materials Science and Engineering.
ELECTROLYTIC DEGRADATION OF LITHIA-STABILIZED POLYCRYSTALLINE BETA-ALUMINA Final Report, 1 Sep. 1977 - 30 Nov. 1983
A. V. Virkar Mar. 1984 8 p refs Submitted for publication
(Contract DE-AC02-77ER-04451)
(DE84-008668; UTEC-84-028) Avail: NTIS HC A02/MF A01

The principal objective of the project was to theoretically and experimentally examine the degradation of Na-(BETA) double prime alumina which is used as a solid electrolyte separator in the Na-S battery as well as in the Na heat engine for direct conversion of heat into electricity. The theoretical development which occurred under this contract is however applicable to cationic solid electrolytes in general and not limited to Na-(BETA) double prime alumina. This is particularly important since now it is known that the (BETA) double prime alumina lattice can be made to conduct a host of other ionic species. Thus, it is expected that solid electrolytes will find applications in various technological systems. As such, a thorough knowledge regarding their durability and failure mode is needed. Several pertinent features regarding failure were identified. Mathematical models were developed to quantitatively describe the mode of filament growth. It was subsequently shown that the three dimensional aspects of crack extension must be incorporated into the analysis. Mathematical models on crack extension included electrochemical aspects of metal/solid electrolyte interface. DOE

N84-31028# Argonne National Lab., Ill. High Energy Physics Div.
RENORMALIZED ACTION IMPROVEMENTS
Cosmas Zachos 1984 9 p refs Presented at the Workshop on Gauge Theory on a Lattice, Argonne, Ill., 5 Apr. 1984
(Contract DE-AC03-76SF-00515)
(DE84-011810; ANL-HEP-CP-84-20; CONF-8404119-2) Avail: NTIS HC A02/MF A01

Finite lattice spacing artifacts are suppressed on the renormalized actions. The renormalized action trajectories of SU(N) lattice gauge theories are considered from the standpoint of the Migdal/Kadanoff approximation. The minor renormalized trajectories which involve representations invariant under the center are discussed and quantified. DOE

N84-31029# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
ELECTROCHROMIC MATERIALS FOR THE REGULATION OF SOLAR ENERGY TRANSMISSION THROUGH WINDOWS
Carl M. Lampert Feb. 1984 15 p refs Presented at the 2nd Intern. Workshop on the Phys. of Semiconductor Devices, New Delhi, India, 5-10 Dec. 1983
(Contract DE-AC03-76SF-00098)
(DE84-012165; LBL-17393; CONF-831278-1; EEB-W-84-04) Avail: NTIS HC A02/MF A01

The concept of an architectural switching film based on solid state electrochromism is introduced. Electrochromic films have the ability to dynamically control solar transmission through a glazing and to alter the energy conduction properties of the window. Switching properties of transition metal oxides based on tungsten and iridium are detailed. The properties of wO3 based films, which can modify both the visible and near infrared portions of the solar spectrum, are given. DOE

N84-31030# Stanford Linear Accelerator Center, Calif.
HIGH-GRADIENT, PULSED OPERATION OF SUPERCONDUCTING NIOBIUM CAVITIES
I. E. Campisi and Z. D. Farkas Feb. 1984 27 p
(Contract DE-AC03-76SF-00515)
(DE84-012498; SU-SLAC/AP-16) Avail: NTIS HC A03/MF A01

Tests performed on several Niobium TM sub 010 cavities at frequencies of about 2856 MHz using a high-power, pulsed method indicate that, at the end of the charging pulse, peak surface magnetic fields of up to approximately 1300 O sub e, corresponding to a peak surface electric field of approximately 68 MV/m, can be reached at 4.2 K without appreciable average losses. Studies of the properties of superconductors under pulsed operation are used to shed light on fundamental properties of radio frequency superconductivity, as well as lead to the possibility of applying the pulse method to the operation of high-gradient linear colliders. DOE

N84-30866# Joint Publications Research Service, Arlington, Va.
NEW PHASE TRANSITION IN SI AND GaAs EXPOSED TO PICOSECOND LASER PULSES Abstract Only
Zh. I. Alferov, Yu. V. Kovalchuk, Yu. V. Pogorelskiy, O. V. Smolskiy, and I. A. Sokolov *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 4 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1373-1376 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30867# Joint Publications Research Service, Arlington, Va.
IMPACT OF WEAK ELECTRIC FIELD ON PHOTOCONDUCTIVITY OF MODIFIED VITREOUS As2Se3 Abstract Only
S. Ye. Abdulgafarov, V. L. Averyanov, and V. M. Lyubin *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 4-5 Transl. into ENGLISH from Pisma v Zh. Tekhn. Fiz. (Leningrad), v. 9, no. 22, 26 Nov. 1983 p 1371-1373 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30869# Joint Publications Research Service, Arlington, Va.
NONCUBIC MAGNETIC ANISOTROPY IN YSmLuCaFeGe GARNET FILMS Abstract Only
V. V. Volkov, M. Marysko, M. Nevrziva, M. Polcarova, and M. Cermak *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 6 Transl. into ENGLISH from Fiz. Tverdogo Tela (Leningrad), v. 25, no. 10, Oct. 1983 p 3086-3090 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30870# Joint Publications Research Service, Arlington, Va.
POLARIZATION OF PARAEXCITON LUMINESCENCE IN Cu2O CRYSTALS IN MAGNETIC FIELD Abstract Only
S. V. Gastev, Ye. L. Ivchenko, G. Ye. Pikus, N. S. Sokolov, and N. L. Yakovlev *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 7 Transl. into ENGLISH from Fiz. Tverdogo

Tela (Leningrad), v. 25, no. 10, Oct. 1983 p 3002-3008 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

N84-30871# Joint Publications Research Service, Arlington, Va.
ELECTRON-MICROSCOPIC MICROSTRUCTURAL EXAMINATION OF GLASSY Ge-Se SEMICONDUCTORS Abstract Only
V. A. Marikhin, T. N. Mamontova, and V. A. Nikitin *In its* USSR Rept.: Phys. and Math. (JPRS-UPM-84-001) 6 Apr. 1984 p 8 Transl. into ENGLISH from Fiz. Tverdogo Tela (Leningrad), v. 25, no. 10, Oct. 1983 p 2923-2929 (For primary document see N84-30862 20-70)
Avail: NTIS HC A03/MF A01

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N84-31031# Illinois Univ., Urbana. Dept. of Physics.
FUN WITH SUPERSYMMETRIC QUANTUM MECHANICS
Barry Freedman and Fred Cooper (Los Alamos Scientific Lab., N. Mex.) Los Alamos, N. Mex. LASL Apr. 1984 21 p Presented at the Workshop on Supersymmetry in Phys., Los Alamos, N. Mex.
(DE84-011329; LA-UR-84-1311; CONF-831267-4) Avail: NTIS HC A02/MF A01

The Hamiltonian and path integral approaches to supersymmetric quantum mechanics were reviewed. The related path integrals for the Witten Index and for stochastic processes were discussed and shown to be indications for supersymmetry breakdown. A system where in the superpotential W(x) has assymetrical values at + or - infinity was considered. Nonperturbative strategies for studying supersymmetry breakdown were described. These strategies are based on introducing a lattice and studying the behavior of the ground state energy as the lattice cutoff is removed. R.S.F.

N84-31032# Bielefeld Univ. (West Germany). Zentrum fuer Interdisziplinaere Forschung.
STOCHASTIC QUANTIZATION: STABILIZING QUANTUM MODELS
Z. Haba May 1984 26 p refs
(Rept-80) Avail: NTIS HC A03/MF A01

Osterwalder-Schrader positivity is shown to be fulfilled for stochastically quantized lattice gauge theories, spin models and P(phi) interactions bounded from below. Problems arising in the stochastic quantization of bottomless P(phi) models are discussed. A stochastic equation is derived to stabilize the quantum Einstein gravity. It is shown that the stochastic quantization of the Yang-Mills theory leads to a well defined semiclassical expansion. Author (ESA)

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N84-30753# Softech, Inc., Waltham, Mass.
THE CECOM SUMMER FACULTY RESEARCH PROGRAM
P. P. Texel *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 42-49 (For primary document see N84-30745 20-61)
(AD-P003421) Avail: NTIS HC A07/MF A01 CSCL 09/2

N84-30754# Pennsylvania State Univ., Middletown.
TEACH Ada (TRADEMARK) AS THE STUDENT'S FIRST PROGRAMMING LANGUAGE?
M. S. Richman *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 50-54 (For primary document see N84-30745 20-61)
(AD-P003422) Avail: NTIS HC A07/MF A01 CSCL 09/2

N84-30765# Tuskegee Inst., Ala.
OPERATING SYSTEM INTERFACE FOR Ada (TRADEMARK) INSTRUCTORS
D. C. Fuhr *In* Army Communications-Electronics Command Proc. of the 2nd Ann. Conf. on Ada (Trademark) Technol. Mar. 1984 p 132-137 (For primary document see N84-30745 20-61)
(AD-P003433) Avail: NTIS HC A07/MF A01 CSCL 09/2

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N84-31033# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
AIR FORCE TECHNICAL OBJECTIVE DOCUMENT FY 85 Technical Report
R. L. Denison Dec. 1983 57 p Supersedes N83-26783; AFWAL-TR-82-4201
(AD-A141925; AFWAL-TR-83-4000; AFWAL-TR-82-4201) Avail: NTIS HC A04/MF A01 CSCL 05/1

This Technical Objective Document was prepared by the Materials Laboratory and describes the Materials Technology Planning Objectives (TPOs) for meeting future Air Force operational needs. The six TPOs encompass the full spectrum of materials capabilities required for future aircraft, missile, space, and electronic systems-Thermal Protection Materials; Aerospace Structural Materials; Aerospace Propulsion Materials; Fluid, Lubricant, and Elastomeric Materials; Protective Coatings and Materials, and Electromagnetic Windows and Electronics. GRA

N84-31034# George Washington Univ., Washington, D.C. Inst. for Management Science and Engineering.
A STEADY-STATE VERSION OF A DYNAMIC OPTIMAL BUDGETING PROBLEM
R. M. Soland 16 Apr. 1984 29 p
(Contract N00014-83-K-0215)
(AD-A142281; GWU/IMSE/SERIAL-T-487/84) Avail: NTIS HC A03/MF A01 CSCL 05/1

We present and justify a steady-state version of a dynamic optimal budgeting problem arising in the Resource Dynamics project. The steady-state model is first reduced to closed form, and then it is analyzed for each of two choices of objective function. Optimal solutions can be found numerically, and are presented for current values of the input data. The numerical results obtained closely approximate those from a piecewise linear approximation to the dynamic version of the problem. GRA

N84-31035# Leadership and Management Development Center, Maxwell AFB, Ala.
A FIELD STUDY OF AIR FORCE ORGANIZATION STRUCTURES Final Report
E. J. Conlon, R. L. Daft, J. S. Austin, and L. O. Short May 1984 86 p
(AD-A142389; LMDC-TR-84-4) Avail: NTIS HC A05/MF A01 CSCL 05/1

Changes in the political, social, economic, and technological environments of organizations have provided an increasingly turbulent context within which organizations must operate. One consequence of these changes is growing concern with developing structural forms which adapt more easily. The Air Force has also become interested in this issue and has requested study focusing on some non-traditional options to more traditional functional structure. This paper reports results of a pilot work for this effort. Included are a discussion of the importance of structure, theoretical models for structural variations and alternatives, a methodology which can be used to study structural issues, and an application of both methodology and theory to specific Air Force situations (aircraft maintenance and systems acquisition). Discussion is provided by answers to specific questions regarding structural issues in the Air Force. GRA

N84-31036# Carnegie-Mellon Univ., Pittsburgh, Pa. Management Sciences Research Group.
A PROBLEM EXPANDING PARAMETRIC PROGRAMMING METHOD FOR SOLVING THE JOB SHOP SCHEDULING PROBLEM
G. L. Thompson and D. J. Zawack Apr. 1984 24 p
(Contract N00014-82-K-0329)
(AD-A142392; MSRR-500) Avail: NTIS HC A02/MF A01 CSCL 05/1

A new zero one integer programming model for the job shop scheduling problem with minimum makespan criterion is presented. The algorithm consists of two parts: (1) a branch and bound parametric linear programming code for solving the job shop problem with fixed completion time; (2) a problem expanding algorithm for finding the optimal completion time. Computational experience for problems having up to 36 operations is presented. The largest problem solved was limited by memory space, not computation time. Efforts are under way to improve the efficiency of the algorithm and to reduce its memory requirements. GRA

N84-31037# Michigan Univ., Ann Arbor. Inst. for Social Research.
A MODEL OF INTER-ORGANIZATIONAL INFLUENCES ON ORGANIZATIONAL PROCESSES Final Technical Report
D. G. Bowers and A. S. Davenport Jun. 1984 196 p
(Contract MDA903-79-C-0330; DA Proj. 2Q1-62717-A-779)
(AD-A142450; ARI-RN-84-91) Avail: NTIS HC A09/MF A01 CSCL 05/1

The purpose of this research was to look for the critical source/sources of variance in local Army unit functioning as measured by leader performance and unit effectiveness. The research question was whether the primary source/sources of inter-unit differences were to be located at the division, brigade, battalion, or company level; or were to be explained on the basis of the people who make them up. Findings were that the primary source of variance was to be found in the people themselves, particularly their education and race. Also that the division to which the company belongs and battalion function have some effect, but much less than the companies themselves. Brigades and battalions were found to have little or no impact on organizational climate. Another finding was that demographic effects do not rise in importance when company rather than individual-level data are considered. While various models of organizational functioning were used, the integrated model, which encompasses portions of both the traditional and collaborative models, was found to have the most power in explaining the variance found in this data set. Results suggest that unit effectiveness will be maximized when units are: (1) composed of persons with some amenability to structure and direction and some respect for legitimate authority, and (2) commanded or led by a style which is collaborative or participative. Author (GRA)

N84-31038# Cardinal Management Associates, Inc., Washington, D.C.
APPROPRIATE TECHNOLOGY SMALL GRANTS PROGRAM EVALUATION, VOLUME 1: EXECUTIVE SUMMARY
Mar. 1984 26 p refs 3 Vol.
(Contract DE-AC01-82CE-15151)
(DE84-010675; DOE/CE-15151/1-Vol-1-Exec-Summ) Avail: NTIS HC A03/MF A01

Volume One contains the Executive Summary which provides a concise overview of the study, including a brief description of the Appropriate Technology Small Grants Program and of the study methodology, highlighted key findings and the Evaluation Team's policy recommendations. DOE

N84-31039# Cardinal Management Associates, Inc., Washington, D.C.
APPROPRIATE TECHNOLOGY SMALL GRANTS PROGRAM EVALUATION, VOLUME 2
Mar. 1984 149 p refs 3 Vol.
(Contract DE-AC01-82CE-15151)
(DE84-010674; DOE/CE-15151/1-Vol-2) Avail: NTIS HC A07/MF A01

An introduction to the Appropriate Technology Small Grants Program Evaluation is presented. Program background is presented, including history, guidelines and operation. The evaluation methodology is presented, specifically the problem statement, study limitations and study methodology. The findings of the study are presented and policy recommendations are discussed. DOE

N84-31040# Executive Office of the President, Washington, D. C. Office of Science and Technology Policy.
SCIENCE AND TECHNOLOGY REPORT TO THE CONGRESS, 1982 Annual Report
3 Oct. 1983 120 p
(DE84-901150; NSF-83-5; AR-5) Avail: NTIS HC A06/MF A01; also available SOD HC $5.00

The science and technology policies outline the framework in which the US Administration is addressing the challenges of maintaining the competitiveness of our industries in the international marketplace and ensuring the continued technological superiority of our defense capabilities. Chapters are included on decisions and actions in science and technology, outlook for selected fields of science, and federal research and development programs. DOE

N84-31041# Pacific Northwest Lab., Richland, Wash.
DEVELOPMENT OF A DOCUMENT PREPARATION STAFF WITHIN AN OFFICE AUTOMATION ENVIRONMENT
James L. Bebee Feb. 1984 14 p Presented at the 1984 Office Systems Res. Conf., Los Angeles, 18-19 Feb. 1984
(Contract DE-AC06-76RL-01830)
(DE84-008649; PNL-SA-12058; CONF-840276-1) Avail: NTIS HC A02/MF A01

The development of a document preparation staff in an office automation environment is discussed. Office automation will undoubtedly create job match challenges that management cannot ignore. To insure the successful implementation of office automation, management should develop job descriptions, build around the experience staff, select staff by thorough evaluation, integrate new staff into the organization, provide planned staff growth and development, and have an ongoing staff development review process. DOE

N84-31042# National Center for Appropriate Technology, Butte, Mont.
TECHNICAL ASSISTANCE AND INFORMATION DISSEMINATION FOR THE APPROPRIATE TECHNOLOGY SMALL GRANTS PROGRAM Final Report, 4 May 1982 - 17 Feb. 1984
1984 200 p
(Contract DE-AC01-82CE-15095)
(DE84-010957; DOE/CE-15095/T1) Avail: NTIS HC A09/MF A01

The Final Report is organized according to the four major contract tasks, with a description of the activities associated with each task followed by a summary of achievements against task milestones. These tasks are to: provide technical assistance; obtain, review, and evaluate grantee final reports; screen the information in reports for dissemination; and prepare how-to publications and other suitable information products. The appendices that follow present several support documents, including a summary of technical assistance clients and the forms used in delivering the service; data collection forms and technology categories used in the report review process; copies of the information materials that were produced; and the mailing list of organizations and agencies participating in the national dissemination program along with support letters and announcements used to coordinate the program with these organizations. DOE

N84-31043# Physics Lab. RVO-TNO, The Hague (Netherlands). Researchgroep 9: Operationele Research.
A SYSTEM FOR POLICY ANALYSIS IN MANPOWER PLANNING. PART 2: DESIGN OF THE DIALOGUE COMPONENT
D. J. D. Wijnmalen Mar. 1984 55 p refs In DUTCH; ENGLISH summary
(Contract A83/KM/001)
(AD-B082961; PhL-1984-12-Pt-2; TDCK-79068) Avail: NTIS HC A04/MF A01

Manpower planning problem areas are discussed, focusing on the system's dialogue component. How the user should handle the system; the concept of hierarchical menus giving access to the dialogue software modules; the dialogue itself; input organization; and software are discussed. Libraries containing routines for cursor positioning on a terminal linked to a CDC Cyber, for interactive file manipulations, and menu creation for interactive programs are used. The software is planned to be programmed in PASCAL 3 and implemented on a CDS Cyber 170/835 computer. A small, simplified version of the system is available. Author (ESA)

N84-31044# General Accounting Office, Washington, D. C.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION'S FIRST-YEAR IMPLEMENTATION OF THE FEDERAL MANAGERS' FINANCIAL INTEGRITY ACT
1 May 1984 33 p
(PB84-188770; GAO/NSIAD-84-100; B-202205) Avail: NTIS HC A03/MF A01 CSCL 05A

GAO conducted a review of 22 federal agencies' efforts to implement the Federal Managers' Financial Integrity Act of 1982. The act was intended to help reduce fraud, waste, and abuse across the spectrum of federal government operations through annual agency self-assessments of their internal controls and accounting systems. This report highlights the progress made and problems encountered by NASA in its first year of experience with this new act. The report focuses on NASA's effort to evaluate internal controls, review accounting systems, and improve the evaluation processes as a result of identified problems. GRA

N84-31045# National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
FEDERAL FUNDS FOR RESEARCH AND DEVELOPMENT, FISCAL YEARS 1981, 1982 AND 1983, VOLUME 31 Final Report, 1981 - 1983
Jul. 1983 58 p
(PB84-189596; NSF-83-320-Vol-31) Avail: NTIS HC A04/MF A01 CSCL 05A

Federal agency R&D funding, as shown in the 1983 budget is considered. The analysis covers R&D program levels for 1981 to 1983, focusing on relative changes from 1982 to 1983. Data are provided on basic research, applied research, and development; on performers of R&D work (intramural, industrial, university-and-college, etc.); and on research by fields of science. The R&D data for 1981 by geographic (State) distribution are included. A section on R&D funding by budget function (national defense, space, health, energy, etc.) in the 1983 budget and in prior years is followed by a section on Federal R&D support to performers. GRA

N84-31046# National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
FEDERAL FUNDS FOR RESEARCH AND DEVELOPMENT, FISCAL YEARS 1982, 1983 AND 1984. VOLUME 32: DETAILED STATISTICAL TABLES
Mar. 1984 197 p
(PB84-189604; NSF-83-319-Vol-32) Avail: NTIS HC A09/MF A01 CSCL 05A

These 133 tables present data on R&D activities of Federal agencies for the 1982 to 1984 period by a number of breaks. They cover research and development by agency, character of work (basic research, applied research and development) and performer, research by agency, performer and field of science; basic research, applied research, and development by agency and performer; total research, basic research and applied research performed at universities and colleges by agency and field of science. They also provide data on R&D plant obligations by agency. In addition, data are provided on foreign performers and the distribution of R&D obligations by State. Historical series for major categories for the 1974-84 period are also given. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N84-31047*# National Aeronautics and Space Administration, Washington, D. C.
INDEX TO NASA NEWS RELEASES AND SPEECHES, 1983
1984 178 p
(NASA-TM-85509; NAS 1.15:85509) Avail: NTIS HC A09/MF A01 CSCL 05B

A listing is presented of 271 news releases distributed by the Office of Public Affairs, NASA Headquarters and 72 selected speeches given by Headquarters staff in 1983. Subject and personal name indexes are arranged alphabetically. Indexes to titles, news release numbers, and accession numbers are arranged numerically. A.R.H.

N84-31048# Naval Postgraduate School, Monterey, Calif.
THE APPLICATION OF A GENERAL PURPOSE DATA BASE MANAGEMENT SYSTEM TO DESIGN AUTOMATION M.S. Thesis
H. J. Walden Dec. 1983 151 p
(AD-A141999) Avail: NTIS HC A08/MF A01 CSCL 09/2

The goal of this research was to determine the validity of the hypothesis that a general purpose relational data base management tool could be used to implement a computer aided design system, and, if found valid, to provide the design of such a data base. Computers have been used to aid in the design of a great number of things, the most widely recognized being VLSI chips. The design of VLSI chips is related to the purpose of the work supported here. Its purpose is to incorporate some previously defined function into VLSI technology. This system, the Computer System Design Environment, instead of defining a new chip uses existing microprocessor technology to devise a specific controller for a given design problem. For instance, suppose one needs a microwave oven controller. Given the performance parameters, this system can design the software, hardware and interconnections of a microprocessor system to perform this control. In other words, this computer-aided design system is used to map a functional specification to a microprocessor and its associated software and peripherals. GRA

N84-31049# Defense Technical Information Center, Alexandria, Va.
GOVERNMENT ACRONYMS AND ALPHABETIC ORGANIZATIONAL DESIGNATIONS USED IN DTIC (DEFENSE TECHNICAL INFORMATION CENTER) Report, Apr. 1984
L. M. Brown May 1984 268 p Supersedes DTIC/TR-83/1, dated Jan. 1983 AD-A124500
(AD-A142700; DTIC/TR-84/5; DTIC/TR-83/1) Avail: NTIS HC A12/MF A01 CSCL 05/2

A guide to acronyms as assigned by the Defense Technical Information Center (DTIC) is given. The listing contains entries from the Department of Defense, Federal Government and foreign military organizations. The acronyms reflect reports processed into the DTIC collections. R.J.F.

N84-31050# California Univ., San Diego. Inst. for Cognitive Science.
INDUCTIVE INFORMATION RETRIEVAL USING PARALLEL DISTRIBUTED COMPUTATION

M. C. Mozer Jun. 1984 27 p
(Contract N00014-79-C-0323)
(AD-A142712; ICS-8406; ONR-8405) Avail: NTIS HC A03/MF A01 CSCL 09/2

Massively parallel, distributed models of computation offer a new approach to the representation and manipulation of knowledge. This paper reports on an application of parallel models to the area of information retrieval. The retrieval system described makes dynamic use of the internal structure of a database to infer relationships among items in the database. Using these relationships, the system can help overcome incompleteness and imprecision in requests for information, as well as in the database itself. Author (GRA)

N84-31051# Defense Technical Information Center, Alexandria, Va.
DEFENSE TECHNICAL INFORMATION CENTER REFERRAL DATA BANK DIRECTORY
M. W. Mullen Feb. 1984 464 p
(AD-A138400; DTIC/TR-84/2) Avail: NTIS HC A20/MF A01 CSCL 05/2

This Defense Technical Information Center (DTIC) directory contains specialized scientific and technical information sources operated or supported by the Department of Defense (DoD) or other Federal Agencies. This is the ninth edition and supersedes the Feb 1981 edition AD-A095600). Arrangement is numerical by referral number with three indexes: Referral, Points-of-Contact, and Subject. There is also a listing of DoD Information Analysis Centers. Each referral shows pertinent information on its mission, special subject areas, availability of material, etc. GRA

N84-31052# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SELECTED BIBLIOGRAPHY OF SOLAR THERMAL LITERATURE. VOLUME 1: BIBLIOGRAPHY
1984 771 p
(Contract DE-AC02-77CH-00178)
(DE84-011386; DOE/CH-00178/T20-Vol-1) Avail: NTIS HC A99/MF A01

The document collection represented in this publication is housed in, and available to the solar thermal community from, the Solar Energy Information Center - a component of the Solar Energy Information Data Bank (SEIDB) - at the Solar Energy Research Institute in Golden, Colorado. The information provided by this publication is divided into two volumes. Volume 1 constitutes the major portion of the publication. This is the volume to which the four sections in Volume 2 refer. It is composed of bibliographic records, each of which contains basic information such as author, title, date, number of pages and so on. The bibliographic records are listed by unique record number (BIBLIO ID NUMBER) in groups by year. Records without dates appear at the beginning of the section under the year 19. DOE

N84-31053# Sandia Labs., Albuquerque, N. Mex.
COMMON DATA INPUT-RETRIEVAL SYSTEM
James E. Pate and James E. Muntz Apr. 1984 17 p Presented at the USE Conf., Dallas, Tex., 2 Apr. 1984
(Contract DE-AC04-76DP-00789)
(DE84-010972; SAND-84-0919C; CONF-8404136-1) Avail: NTIS HC A02/MF A01

The common data input/retrieval system (CDIRS) is a generalized software system which is incorporated into an application system to perform application data input and/or retrieval processing. The system operates in the on-line mode in the transaction-processing (TIP) environment, and in batch mode. The system may be used for retrieval and/or updating of both the transaction data base and the application database. Features provided include data input/retrieval screens which are tailored to designer's specifications, access to transactions via six retrieval paths, backup and recoverability of transactions, and periodic archival of processed transactions. The system consists of 40 programs, of which 36 are written in COBOL and 4 are written in ASSEMBLER. Forty three action codes are provided to accomplish various combinations of DMS activities. Security is available at three levels: datasystem level, user level, and transaction level. The CDIRS environment is reviewed from a user perspective. DOE

N84-31054# Sandia Labs., Albuquerque, N. Mex.
DBMS CONVERSION CASE STUDY
B. C. Dale 1984 14 p Presented at the 2nd Ann. DPMA Software Maintenance Symp., Washington, D.C., 7 May 1984
(Contract DE-AC04-76DP-00789)
(DE84-011205; SAND-84-0581C; CONF-8405148-1) Avail: NTIS HC A02/MF A01

The Integrated Procurement System (IPS) is a very large data base application that supports purchasing, accounts payable and cost accounting for materials and services. A redevelopment effort was launched to design and program a new Integrated Procurement System which would incorporate several features not available in the old version, including the capability to account for line item details on purchase orders and to perform our receiving function in an automated fashion rather than manually. All data input via screen programs is desired, i.e., terminal input rather than keypunch and batched. The development of this conversion is described. DOE

N84-31055# Oak Ridge National Lab., Tenn. Information Center Complex Publications Office.
INFORMATION CENTER COMPLEX PUBLICATIONS AND PRESENTATIONS, 1971-1982
S. W. Hawthorne and A. B. Johnson Feb. 1984 227 p
(Contract DE-AC05-84OR-21400)
(DE84-010603; ORNL-6002) Avail: NTIS HC A11/MF A01

An indexed bibliography is presented which lists publications and presentations of the staff of the Information Center Complex, Information Division, Oak Ridge National Laboratory, from 1971 through 1982. Entries cover: toxicology, air and water pollution, management and transportation of hazardous wastes, energy resources and conservation, and information science. Publications range in length from 1 page to nearly 4000 pages and include topical reports, books, journal articles, fact sheets, and newsletters. Author, title, and group indexes are provided. Annual supplements are planned. DOE

N84-31056# National Center for Appropriate Technology, Butte, Mont.
APPROPRIATE TECHNOLOGY MANAGEMENT INFORMATION SYSTEM
Feb. 1984 763 p
(Contract DE-AC01-82CE-15095)
(DE84-010952; DOE/CE-15095/14) Avail: NTIS HC A99/MF A01

Grants were given in the full range of technology areas which included conservation, solar, biomass, wind, geothermal, and hydro power. The final report from each DOE grantee was reviewed to extract information about new ideas and proven concepts that could be of value to the public. The appropriate technology management information system (ATMIS), a computer data base, was developed to manage the growing wealth of information from the grant reports, and to monitor the report review process. The ATMIS classifies data into numerous categories (technology area, geographic location, project status, etc.). This manual which was generated directly from the data base is presented. DOE

N84-31057# Midwest Research Inst., Golden, Colo.
SOLAR RADIATION DATA DIRECTORY: A GUIDE TO SOLAR RADIATION AND METEOROLOGICAL DATA COLLECTION ACTIVITIES IN THE US Technical Information Branch.
Suzanne Grundstrom, comp. and Susan Thompson, comp. Dec. 1983 147 p
(Contract DE-AC02-83CH-10093)
(DE84-000095; SERI/SP-281-1973) Avail: NTIS HC A07/MF A01

Solar radiation and related meteorological data collection activities in the United States, past and present are described. State and local independent efforts which would otherwise remain obscure are emphasized. A representative overview of the availability of solar radiation data in each of the states is presented. Solar radiation and meteorological data collection activities are classified as state and local efforts, or as national and regional (multistate) monitoring networks. Over 200 historical and ongoing monitoring programs at the state and local levels are summarized. These are arranged alphabetically by responsible agency within each state and include both selected references and contact information for each entry. Information in a similar format for 32 national, regional, and multistate monitoring networks, with the entries arranged alphabetically by responsible agency is presented. DOE

N84-31058# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
COMMON DATA BASE EXPERIMENT: DETECTION AND LOCATION CAPACITY
Harriet Ohlsson May 1984 25 p refs
(FOA-C-20538-T1; ISSN-0347-3694) Avail: NTIS HC A02/MF A01

Seismic data from 21 countries for a two week period were used to assess the capability of the Common Data Base Experiment (CDBE) station network to detect and locate nuclear explosions. Comparison with International Seismological Center (ISC) data shows that the detection and location capability of the CDBE station network does not reach the limits proposed in CCD/558. However, the limited number of events gives a poor statistical background. This is very clearly seen in the calculation of the location capability in the southern hemisphere. As the calculations are made on real data there is also an uncertainty in the ISC bulletin, which was not taken into account. Author (ESA)

N84-31059# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
THE OPTICAL COINCIDENCE INFORMATION RETRIEVAL SYSTEM (OCIR)
G. K. Hartmann 1984 14 p refs Presented at Intern. Cooperation (ICC) Intern., Zurich, Apr. 1984
(MPAE-L-66-84-10) Avail: NTIS HC A02/MF A01

The Optical Coincidence Information Retrieval System (OCIR), based on an inverted thesaurus (going from specific to general terms in an unhierarchical manner) is described. The hardware in its first stage is based upon a (mechanical) Optical Coincidence Card System which can be implemented in any nonindustrialized country. In its second stage it is implemented on a personal computer. In a third stage it can be supplemented by large computers having free text search capabilities. The OCIR concept allows the generation of many fairly small decentralized and autonomous information systems which might be linked through or into an information center. Author (ESA)

N84-31060# National Telecommunications and Information Administration, Washington, D.C.
POLICY IMPLICATIONS OF INFORMATION TECHNOLOGY
R. K. Salaman and E. C. Hettinger Feb. 1984 50 p refs
(PB84-183219; NTIA-84-144) Avail: NTIS HC A03/MF A01 CSCL 05B

Three-quarters of the U.S. employment and one-half of the Gross National Product (GNP) are associated with services. In 1981, services employment predominated, for the first time, over both agriculture and manufacturing, even in the Third World countries. The increasing importance of services to the economy and the society has been stimulated by the greater availability of information and communications products. A project devoted to formulation of national information policy as necessary to accommodate the new opportunities presented by advanced information technologies, and the impact on the economy and society is analyzed. The meaning of information policy is defined, the report and current issues concerning domestic industry, growth, maintaining international leadership, and new considerations regarding intellectual property are discussed. GRA

N84-31061# National Science Foundation, Washington, D.C.
NATIONAL SCIENCE FOUNDATION, VOLUME 1 Annual Report, 1982
Jun. 1983 118 p 2 Vol.
(PB84-193234; NSF-83-1; AR-32) Avail: NTIS HC A06/MF A01 CSCL 05A

The results of scientific & engineering research supported by the National Science Foundation during the past fiscal year are investigated. Topics include engineering, mathematics, education, chemistry, physics, materials research, computer research, astronomy, Earth science, life science, and research policy studies. GRA

N84-30377*# Energy, Mines and Resources Canada, Ottawa (Ontario).
A PRELIMINARY ASSESSMENT OF LANDSAT-4 THEMATIC MAPPER DATA Abstract Only
D. G. Goodenough, E. A. Fleming, and K. Dickinson *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 189 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

N84-30378*# Canada Centre for Remote Sensing, Ottawa (Ontario).
REVISED RADIOMETRIC CALIBRATION TECHNIQUE FOR LANDSAT-4 THEMATIC MAPPER DATA BY THE CANADA CENTRE FOR REMOTE SENSING
J. Murphy, T. Butlin, P. Duff, and A. Fitgerald *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 1 Jul. 1984 p 190-198 ERTS (For primary document see N84-30359 20-42)
Avail: NTIS HC A10/MF A01 CSCL 05B

N84-30385*# Laboratoire de Meteorologie Dynamique, Paris (France).
CALIBRATION OF TM DATA FROM GROUND-BASED MEASUREMENTS
S. I. Rasool and P. Y. Deschamps (CNES, Toulouse) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 21-22 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30390*# Geological Survey, Reston, Va.
ANALYSIS OF LANDSAT-4 TM DATA FOR LITHOLOGIC AND IMAGE MAPPING PURPOSE
M. H. Podwysocki, J. W. Salisbury, L. V. Bender, O. D. Jones, and D. L. Mimms *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 35-39 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30394*# Purdue Univ., Lafayette, Ind.
SPATIAL RESOLUTION ESTIMATION OF LANDSAT-4 TM DATA Abstract Only
Clare D. McGillem, Paul E. Anuta, Erick Malaret, and Kai-Bor Yu (Virginia Polytechnic Inst., Blacksburg) *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 53 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30397*# Geological Survey, Flagstaff, Ariz.
TESTS OF LOW-FREQUENCY GEOMETRIC DISTORTIONS IN LANDSAT-4 IMAGES Abstract Only
R. M. Batson and W. T. Borgeson *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 59 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30398*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
INVESTIGATION OF TM BAND-TO-BAND REGISTRATION USING THE JSC REGISTRATION PROCESSOR
S. S. Yao and M. L. Amis *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 60-61 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30399*# EROS Data Center, Sioux Falls, S. Dak.
GEODETIC ACCURACY OF LANDSAT-4 MULTISPECTRAL SCANNER AND THEMATIC MAPPER DATA Abstract Only
J. M. Thormodsgard and D. J. Devries *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 62-63 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30404*# Canada Centre for Remote Sensing, Ottawa (Ontario).
RADIOMETRIC CALIBRATION AND GEOCODED PRECISION PROCESSING OF LANDSAT-4 MULTISPECTRAL SCANNER PRODUCTS BY THE CANADA CENTRE FOR REMOTE SENSING Abstract Only
J. Murphy, D. Bennett, and F. Guertin *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 81 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30405*# National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
LANDSAT SCENE-TO-SCENE REGISTRATION ACCURACY ASSESSMENT Abstract Only
James E. Anderson *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 82 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30406*# Georgia Univ., Athens. Dept. of Geography.
GEOMETRIC ACCURACY OF LANDSAT-4 MSS IMAGE DATA
R. Welch and E. Lynn Usery *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 83-84 Previously announced as N83-27322 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30407*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEOMETRIC ACCURACY ASSESSMENT OF LANDSAT-4 MULTISPECTRAL SCANNER (MSS)
Marc L. Imhoff and William L. Alford *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 85-86 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30409*# General Electric Co., Lanham, Md. Space Div.
LANDSAT-4 MSS GEOMETRIC CORRECTION: METHODS AND RESULTS
J. Brooks, E. Kimmer, and J. Su *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 91-92 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30414*# National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
AN INITIAL ANALYSIS OF LANDSAT-4 THEMATIC MAPPER DATA FOR THE DISCRIMINATION OF AGRICULTURAL, FORESTED WETLAND, AND URBAN LAND COVERS
Dale A. Quattrochi *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 111-112 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30415*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PRELIMINARY EVALUATION OF THEMATIC MAPPER IMAGE DATA QUALITY Abstract Only
R. B. MacDonald, F. G. Hall, D. E. Pitts, R. M. Bizzell, S. Yao, C. Sorensen, E. Reyna, and J. Carnes *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 113 Prepared in cooperation with Lockheed Engineering and Management Services Co., Inc., Houston, Tex. ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30417*# Technische Univ., Munich (West Germany). Faculty for Geosciences.
A CONCEPT FOR THE PROCESSING AND DISPLAY OF THEMATIC MAPPER DATA
Rupert Haydn *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 116-118 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30418*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
QUICK LOOK ANALYSIS OF TM DATA OF THE WASHINGTON, DISTRICT OF COLUMBIA AREA
Darrel L. Williams, James R. Irons, Brian L. Markham, Richard S. Latty (Maryland Univ., College Park), and Mark L. Stauffer (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 119-120 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30420*# Agricultural Research Center, Beltsville, Md. Hydrology Lab.
COMPARISON OF THE INFORMATION CONTENT OF DATA FROM THE LANDSAT-4 THEMATIC MAPPER AND THE MULTISPECTRAL SCANNER Abstract Only
John C. Price *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 128 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30422*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THEMATIC MAPPER DATA QUALITY AND PERFORMANCE ASSESSMENT IN RENEWABLE RESOURCES/AGRICULTURE REMOTE SENSING Abstract Only
Robert M. Bizzell and Harold L. Prior *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 133-134 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30423*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRELIMINARY COMPARISONS OF THE INFORMATION CONTENT AND UTILITY OF TM VERSUS MSS DATA Abstract Only
Brian L. Markham *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 135-136 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30424*# Delaware Univ., Newark. Coll. of Marine Studies.
PARAMETRIC AND NONPARAMETRIC ANALYSIS OF LANDSAT TM AND MSS IMAGERY FOR DETECTING SUBMERGED PLANT COMMUNITIES

Steven G. Ackleson and Vytautas Klemas *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 137-140 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30425*# Department of Agriculture, Washington, D.C.
A FIRST EVALUATION OF LANDSAT TM DATA TO MONITOR SUSPENDED SEDIMENTS IN LAKES Abstract Only
F. R. Schiebe, J. C. Ritchie, and G. O. Boatwright *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 141 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

N84-30430*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FINAL COMPARISON OF TM AND MSS DATA FOR SURFACE MINE ASSESSMENT IN LOGAN COUNTY, WEST VIRGINIA
R. G. Witt, H. W. Blodget, and R. M. Marcell (Scientific Applications Research, Riverdale, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 160-166 refs ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 08I

N84-30432*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RELATIVE ACCURACY ASSESSMENT OF LANDSAT-4 MSS AND TM DATA FOR LEVEL 1 LAND COVER INVENTORY
E. M. Middleton, R. G. Witt, Y. C. Lu (Computer Sciences Corp., Silver Spring, Md.), and R. S. Sekhon (Computer Sciences Corp., Silver Spring, Md.) *In its* LANDSAT-4 Sci. Invest. Summ., Including Dec. 1983 Workshop Results, Vol. 2 Jul. 1984 p 171-172 ERTS (For primary document see N84-30380 20-42)
Avail: NTIS HC A09/MF A01 CSCL 05B

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N84-31062# Naval Sea Systems Command, Washington, D.C.
IMPROVING SYSTEM AFFORDABILITY
N. N. Riegle Mar. 1984 15 p Presented at the 21st Ann. Tech. Symp. of the Assoc. of Sci. and Engr. of the Naval Sea Systems Command, Washington, D.C., 1984
(AD-A142387) Avail: NTIS HC A02/MF A01 CSCL 05/3

This paper is an announcement of the expansion of the Navy's Standard Electronic Module Program (SEM) into a larger more comprehensive program to be known as SHARP for Standard Hardware Acquisition & Reliability Program. The paper is intended to discuss the factors which impact cost in all phases of the program's life; a common sense look at what major cost drivers are, and what can be done to control them. The paper will analyze standardization, quality, reliability, testability, and repairability with a look at their impacts on Navy life cycle costs. Special emphasis will be placed on the ability of standardization programs to adopt new technologies. In this day of increased costs and restriction of funds, it is imperative that weapons systems developers recognize the full impact of their efforts on overall life cycle costs and not concentrate solely on the development phase. GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N84-31063# Committee on Science and Technology (U. S. House).
LAND REMOTE-SENSING COMMERCIALIZATION ACT OF 1984
Washington GPO 1984 47 p Rept. to accompany H. R. 5155 presented by the Comm. on Sci. and Technol. to the 98th Congr., 2nd Sess., 3 Apr. 1984
(H-Rept-98-647; GPO-31-006) Avail: US Capitol, House Document Room

A bill from the House Committee on Science and Technology on the provision to establish a system to promote the commercialization of land remote sensing satellite data is presented. The bill proposes to provide for the phased commercialization of land remote sensing data, to establish a clear framework of national security and international policy requirements within which private remote sensing space systems operate, to provide for the archiving of a basic set of land remote sensing data that will serve the public interest for global environmental monitoring, to designate the Department of Commerce as the lead agency for transferring space remote sensing to the private sector, and to prohibit the commercialization of meteorological satellites. A cost estimate from the Congressional Budget Office is included. E.R.

N84-31064# Committee on Energy and Commerce (U. S. House).
US TECHNOLOGY TRANSFER TO CHINA
Washington GPO 1984 78 p Hearing before the Special Subcomm. on US Trade with China of the the Comm. on Energy and Com., 98th Congr., 1st Sess., 27 Sep. 1983
(GPO-29-567) Avail: Special Subcommittee on US Trade with China

The proceedings of a hearing before the Special Subcommittee on U.S. Trade With China are presented. The transfer of U.S. technology to China was considered. United States commodities on which export restrictions were amended are enumerated. These include electronic computers, software, ion implantation and sputtering equipment, frequency converters, analog to digital and digital to analog converters, electronics chips, display devices and oscilloscopes. R.S.F.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation*, and *44 Energy Production and Conversion*.

N84-31065# Tennessee Valley Authority, Chattanooga. Div. of Energy Demonstrations and Technology.
TVA AND THE ELECTRIC VEHICLE
1983 11 p
(DE84-900907; TVA/OP/EDT-83/33) Avail: NTIS HC A02/MF A01

The reliability testing carried out on electric vehicles is described. Seventeen vehicles including passenger car, station wagons, pick up trucks, and minivans were tested under real world conditions. Tests include vehicle reliability testing, vehicle performance testing, in vehicle battery testing, battery charger testing, and EV support systems testing. DOE

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N84-31066*# Lowell Observatory, Flagstaff, Ariz. Planetary Research Center.
THE OCCULTATION OF AG+29 DEG 398 BY 93 MINERVA
R. L. Millis, L. H. Wasserman, E. Bowell, O. G. Franz, R. Nye, W. Osborn (Central Michigan Univ.), and A. Klemola (California Univ., Santa Cruz) 23 Aug. 1984 22 p refs
(Grant NsG-7603)
(NASA-CR-173827; NAS 1.26:173827) Avail: NTIS HC A02/MF A01 CSCL 03A

On 22 Nov. 1982, the asteroid 93 Minerva occulted AG-29 deg 398 (= SAO 76O17A), a seventh magnitude star of AO spectral type. The data were best fitted by a circular limb profile having a diameter of 170.8 + or - 1.4 km, a value that agrees well with the published radiometric diameter for this asteroid. However, evidence of significant departure from a spherical shape is found in the occultation observations and in photometric measurements of Minerva. Additional observations are required to specify difinitively the three dimensional figure of Minerva. R.S.F.

N84-31067# European Southern Observatory, Munich (West Germany).
[ACTIVITIES IN ASTRONOMY] Annual Report, 1983
1983 81 p refs In ENGLISH, FRENCH and GERMAN Original contains color illustrations
(ISSN-0531-4496) Avail: NTIS HC A05/MF A01

The research activities and facilities of the European Southern Observatory are described. Research areas include the Magellanic Clouds, galactic clusters, quasars, stellar spectra, and a sky atlas. Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N84-31068*# Arizona Univ., Tucson.
STUDIES OF X-RAY CLUSTERS OF GALAXIES/INTERGALACTIC PLASMAS Final Report
John S. Scott 22 Aug. 1984 16 p refs
(Grant NAGw-124)
(NASA-CR-173825; NAS 1.26:173825) Avail: NTIS HC A02/MF A01 CSCL 03B

Intergalactic plasmas were investigated from both an observational and theoretical point of view. A multiobject spectrometer, the MX spectrograph was used to obtain detailed dynamical information on clusters of galaxies; this information was then compared with X ray emission from hot gas in these clusters. Several spectra of galaxies are presented, and data reduction of the spectra was discussed. The existence of quasar winds in Seyfert galaxies and the interaction between such a wind and the interstellar medium also were considered. R.S.F.

N84-31069*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SUBMILLIMETER WAVELENGTH SURVEY OF THE GALACTIC PLANE FROM L = -5 DEG TO L = +62 DEG: STRUCTURE AND ENERGETICS OF THE INNER DISK
M. G. Hauser, R. F. Silverberg, M. T. Stier, T. Kelsall, D. Y. Gezari, E. Dwek, D. Walser, J. C. Mather, and L. H. Cheung Mar. 1984 57 p refs Submitted for publication
(NASA-TM-86077; NAS 1.15:86077) Avail: NTIS HC A04/MF A01 CSCL 03B

Results from a large scale survey of the first quadrant of the Milky Way galactic plane at wavelengths of 150, 250, and 300 microns with a 10x10 arcmin beam are presented. The emission detected in the survey arises from compact sources, most of which are identified with known peaks of 5 GHz and/or CO emission, and from an underlying diffuse background with a typical angular width of approximately 0.9 deg (FWHM) which accounts for most of the emission. A total of 80 prominent discrete sources were identified and characterized, of which about half were not previously reported at far infrared wavelengths. The total infrared luminosity within the solar circle is approximately 1 to 2x10 to the 10th power L sub 0, and is probably emitted by dust that resides in molecular clouds. R.S.F.

N84-31070# National Oceanic and Atmospheric Administration, Boulder, Colo. Air Resources Lab.
THE NOAA-ERL-ARL SOLAR UV RADIATION AND CLIMATE RESEARCH PROJECT PROGRAM DESCRIPTION Progress Report
Richard F. Donnelly, Lawrence C. Puga, Thomas P. Repoff, and Judith L. Lean (Colorado Univ., Boulder) Feb. 1984 145 p refs
(PB84-183292; NOAA-TM-ERL-ARL-126; NOAA-84041905) Avail: NTIS HC A07/MF A01 CSCL 03B

The status of the Solar UV Radiation and Climate Research Project was reviewed. Topics discussed included the following: solar ultraviolet (UV) radiation and climate research, atmospheric effects of solar UV variability, solar UV variations, models of solar UV spectral irradiance, plages and solar indices, intermediate term epochs in solar UV emission at 180 nm, spectroradiometer design rationale, ultraviolet radiation at the South Pole, and the performance of radiometric standard detectors (110 to 360 nm). Author (GRA)

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N84-31071# California Univ., Livermore. Lawrence Livermore Lab. Physics Dept.
COSMIC BOMBARDMENT
Roderick A. Hyde 19 Mar. 1984 8 p refs
(Contract W-7405-eng-48)
(DE84-011402; UCID-20062) Avail: NTIS HC A02/MF A01

Throughout its history, the Earth was constantly bombarded by interplanetary bodies. Such collisions created the planet and than fed its growth. With time, the rate of such collisions dropped enormously, as most of the loose matter was swept either up or out of the solar system. However, because our planet evolved and acquired an increasingly sophisticated biosphere, the significance of cosmic bombardment has not decreased. In the past, individuals, species, and even entire branches of the evolutionary tree were terminated by cosmic bombardment. A two part system, featuring passive surveillance to identify threats, followed by an active defense to deflect or destroy incoming projectiles is required. A set of automated telescopes to warn of first pass deadly comets and asteroids is also needed. A catalog of the Apollo asteroids, enabling the prediction of collisions with ever smaller asteroids many years in advance is planned. DOE

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N84-31072# Los Alamos Scientific Lab., N. Mex.
THE 19TH MORIOND MEETING: SUMMARY TALK [19TH MORIOND RECONTRE DE MORIOND]
S. P. Rosen 1984 23 p refs Presented at 4th Workshop on Massive Neutrinos in Particle Astro-Phys., La Plaque, France

(Contract W-7405-eng-36)
(DE84-010053; LA-UR-84-826; CONF-840150-1) Avail: NTIS HC A02/MF A01

The theoretical arguments for neutrino mass are reviewed, and the status of searches for neutrino mass in neutrino oscillations, direct measurements, and other experiments are summarized. DOE

N84-31073# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 473. PART 1: (PROMPT REPORTS) DATA FOR DECEMBER 1983, NOVEMBER 1983 AND LATE DATA
H. E. Coffey Jan. 1984 106 p 2 Vol.
(PB84-180611; SGD-473-Pt-1; NOAA-84032305-Pt-1) Avail: NTIS HC A06/MF A01 CSCL 03B

Solar/geophysical information is presented in index form. Categories include detailed index for 1983; data for December 1983-(UWDS alert periods (advance and worldwide), Solar activity indices, Solar flares, Soar radio emission, inferred interplanetary magnetic field polarity, Mean solar magnetic field, Boulder geomagnetic substorm log); Data for November 1983-(Solar active regions, Sudden ionospheric disturbances, Solar radio spectral observations, Cosmic ray measurements by neutron monitor, Geomagnetic indices, Radio propgation indices.) M.A.C.

N84-31074# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 473. PART 2: (COMPREHENSIVE REPORTS) DATA FOR JULY 1983, MARCH 1981 AND MISCELLANEA
H. E. Coffey Jan. 1984 84 p 2 Vol.
(PB84-180629; SGD-473-Pt-2; NOAA-84032306-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 03B

Solar activity, interplanetary phenomena, and geomagnetic phenomena are presented in index form for 1983. M.A.C.

N84-31075# National Center for Atmospheric Research, Boulder, Colo. High Altitude Observatory.
WHITE LIGHT SOLAR CORONA: AN ATLAS OF 1983 K-CORONAMETER SYNOPTIC CHARTS Technical Report, Dec. 1982 - Jan. 1984
K. Rock, R. Fisher, C. Garcia, P. Seagraves, and E. Yasukawa Feb. 1984 75 p refs Sponsored in part by NSF
(PB84-184159; NCAR/TN-229) Avail: NTIS HC A04/MF A01 CSCL 03B

The data obtained by the Mark-111 K-coronameter located at the Mauna Loa Solar Observatory, Hawaii, are presented. This volume includes a complete data set of Carrington rotations covering 1983 and two additional sections, the activity report summary for 1983 and polar synoptic charts. This set of synoptic data is a preliminary presentation in which no corrections were made for the day-to-day variations in sky transmission and scattering of polarized light by the Earth's atmosphere. Some inaccuracy is incurred in neglecting these effects, but it is still possible to use the data set as a characterizaion of the white light corona. Author (GRA)

N84-31076# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA PROMPT REPORTS, FEBRUARY 1984, NUMBER 474. PART 1: DATA FOR JANUARY 1984, DECEMBER 1983 AND LATE DATA. EXPLANATION OF DATA REPORTS ISSUED AS NUMBER 474 (SUPPLEMENT) FEBRUARY 1984
Helen E. Coffey, ed Feb. 1984 110 p 3 Vol.
(PB84-188689; SGD-474-Pt-1; NOAA-84043005-Pt-1) Avail: NTIS HC A06/MF A01 CSCL 03B

Solar activity data are presented. Particular parameters considered were: H alpha solar flares, solar radio emission, magnetic storms, interplanetary magnetic fields, solar magnetic field, sudden ionospheric disturbances, cosmic rays, and radio transmission. Magnetograms are also given. R.S.F.

N84-31077# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA COMPREHENSIVE REPORTS, FEBRUARY 1984, NUMBER 474. PART 2: DATA FOR AUGUST 1983, APRIL 1981 AND MISCELLANEA. EXPLANATION OF DATA REPORTS ISSUED AS NUMBER 474 (SUPPLEMENT) FEBRUARY 1984
Helen E. Coffey, ed. Feb. 1984 96 p 3 Vol.
(PB84-188671; SGD-474-Pt-2; NOAA-84043006-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 03B

Solar activity data are presented in tabular form. Solar radio bursts, mass ejections from the Sun, and H alpha solar flares were enumerated. Several solar maps are shown. R.S.F.

N84-31078# National Geophysical Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA EXPLANATION OF REPORTS, FEBRUARY 1984, NUMBER 474, SUPPLEMENT
Helen E. Coffey, ed. Feb. 1984 84 p 3 Vol.
(PB84-188697; SGD-474-Suppl; NOAA-84050301) Avail: NTIS HC A05/MF A01 CSCL 03B

The data contained in the monthly publication Solar-Geophysical Data were described and explained herein. The following topics were addressed: solar radio waves, solar wind, interplanetary magnetic fields, solar magnetic field, geomagnetic activity, solar proton events, sudden ionosheric disturbances, cosmic rays, radio propagation, solar flares, energetic solar particles, solar X-rays, and mass ejections from the Sun. R.S.F.

N84-30465*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LAGEOS ORBIT AND SOLAR ECLIPSES
David P. Rubincam *In its* Res. Activities of the Geodyn. Branch Jun. 1984 2 p (For primary document see N84-30455 20-42)
Avail: NTIS HC A06/MF A01 CSCL 03B

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N84-31079*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FUNDAMENTAL AND HARMONIC EMISSION IN INTERPLANETARY TYPE 2 RADIO BURSTS
D. Lengyel-Frey (SAR), R. G. Stone, and J.-L. Bougeret (Observatoire de Paris) Apr. 1984 29 p refs
(NASA-TM-86099; NAS 1.15:86099) Avail: NTIS HC A03/MF A01 CSCL 03B

Three interplanetary type II radio bursts which show two prominent and long duration bands in their dynamic spectra were analyzed in detail and compared to similar bands in meter wavelength type II events. These bands, which differ by a factor of about two in frequency, were interpreted in terms of fundamental and harmonic emission. The fundamental component has a greater average intensity than the harmonic, due largely to short intense brightenings. The fundamental spectral profile is more narrow than that of the harmonic, with harmonic band typically exhibiting a larger bandwidth to frequency ratio than the fundamental by a factor of two. The fundamental has a larger source size than the harmonic, 160 degrees versus 110 degrees, on average, as viewed from the Sun. Two of the events have source positions which correlate well with the associated flare positions. Author

N84-31080# Los Alamos Scientific Lab., N. Mex.
THE GALACTIC ACCELERATION OF ULTRAHIGH ENERGY COSMIC RAYS
Stirling A. Colgate 1984 5 p refs Presented at the Recontre de Moriond on Electro-Weal Interactions and Unified Theories, La Plaque, France, 26 Feb. - 4 Mar. 1984
(Contract W-7405-eng-36)
(DE84-012442; LA-UR-84-1667; CONF-840280-4) Avail: NTIS HC A02/MF A01

Ultrahigh energy cosmic rays are likely to originate in old galaxies because of the difficulty with acceleration in special extragalactic circumstances. An extended magnetic field in the galaxy is necessary to give sufficient time dispersion from supernova events if supernova are the origin of such particles. Acceleration must be either parallel to a magnetic field such as would occur during the initial formation of a magnetic neutron star, or formed in the relativistic supernova envelope shock. DOE

N84-31081# Los Alamos Scientific Lab., N. Mex.
PHOTON LOSSES IN COSMIC RAY ACCELERATION IN ACTIVE GALACTIC NUCLEI
Stirling A. Colgate 1984 7 p refs Presented at the Recontre de Moriond Meeting on Elec. Weal Interactions and Unified Theories, La Plaque, France, 26 Feb. 4 Mar. 1984
(Contract W-7405-eng-36)
(DE84-012583; LA-UR-84-1666; CONF-840280-3) Avail: NTIS HC A02/MF A01

The usual assumption of the acceleration of ultrahigh energy cosmic rays, greater than or equal to 10 to the 18th power eV in quasars, Seyfert galaxies, and other active galactic nuclei is challenged on the basis of the photon interactions with the accelerated nucleons. This is similar to the effect of the black body radiation on particles 10 to the 20th power eV for times of the age of the universe except that the photon spectrum is harder and the energy density greater by approximately 10 to the 13th power. Hence, a single traversal, radial or circumferential, of radiation whose energy density is no greater than the emitted flux will damp an ultrahigh energy cosmic ray 10 to the 20th power eV by greater than 10,000 times its energy. It is unlikely that any reasonable configuration of acceleration can avoid disastrous photon energy loss. A different site for ultrahigh energy cosmic ray acceleration must be found. DOE

99 GENERAL

N84-31082# Technische Univ., Berlin (West Germany).
RESEARCH ACTIVITIES. PART 1: STATEMENTS Status Report, 1979-1982 [FORSCHUNGSBERICHT, 1979-1982. TEIL 1: BERICHTSTEIL]
H. Griese 1982 97 p In GERMAN
(ISBN-3-7983-0959-0) Avail: NTIS HC A05/MF A01

Research organization at the Technical University of Berlin is discussed. Research includes: communication and history; planning and social sciences; mathematics; physics; synthetic and analytical chemistry; physical and applied chemistry; civil engineering and surveying; architecture; physical engineering sciences; construction and fabrication; food and biotechnology; landscape development; international agricultural development; mining and geosciences; material sciences; economic sciences; electrotechnics; computer science; education and instruction sciences. Author (ESA)

N84-31083# European Space Agency, Paris (France).
SCIENTIFIC-TECHNICAL FACILITIES DEPARTMENT. SCIENTIFIC-TECHNICAL REPORT Status Report, 1983
Jun. 1984 315 p refs Transl. into ENGLISH from "Ber. Wiss.-Tech. Bertriebseinrichtungen. Wiss.-Tech. Ber. Stand 1983" DFVLR, West Germany
(ESA-TT-843) Avail: NTIS HC A14/MF A01

The organization of DFVLR's Scientific-Technical Facilities Department is described. Tasks include: systems analyses and studies; design, set-up and deployment of technical facilities; development of software, operational processes and routines; system integration and testing; documentation; and advising users and authorities. Space systems, Earth observation, and aircraft are the main research areas.

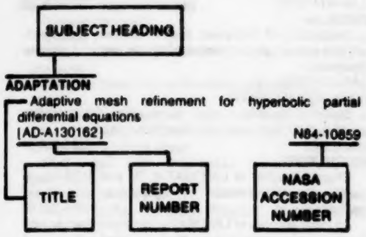
N84-31084# Centre National de Recherches de l'Espace, Brussels (Belgium).
SPACE RESEARCH IN BELGIUM, 1982-1983
1984 50 p refs Presented at 25th COSPAR Plenary Meeting, Graz, 25 Jun.- 7 Jul. 1984
Avail: NTIS HC A04/MF A01

Belgian participation in Spacelab, ozonometry, MAP/GLOBUS, solar irradiance monitoring, multispectral photography of the upper atmospheric aerosol layers, atmospheric composition, ionosphere, plasmapause, magnetopause, planetology, and planetary insolation projects is summarized. Author (ESA)

SUBJECT INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 22 NUMBER 20

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABERRATION
The Spot of Arago and its role in aberration analysis
[AD-A141983] N84-30952
Optical support Hartmann sensor optical simulation
[AD-A142525] N84-30955

ABRASION
Impact dynamics research on composite transport structures N84-29975

ABSORBENTS
Iron nitrate and MON-3 nitrogen tetroxide N84-29909

ABSORPTION SPECTRA
Trace analysis in quartz
[AD-A142425] N84-29988
The blue-green spectrum of gaseous Pb2 wave numbers and constants of the FOu+ - XOg+ system
[USIP-84-06] N84-30009
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86285] N84-30566

ABSORPTION SPECTROSCOPY
Quality engineering and control
[DE84-011603] N84-30001

ABSORPTIVITY
Visualization for a free jet by a laser induced fluorescence method and its structure N84-30120
Performance tests of the Solar Steam, Incorporated, 9-m deep-dish solar concentrating collector
[DE84-000079] N84-30535
Spray pyrolysis of cadmium sulfide/copper indium selenide cells
[DE84-004491] N84-30537

ABSTRACTS
Proceedings of the DOE Physical and Chemical Energy Storage Annual Contractors' Review Meeting
[DE83-017536] N84-30540

Inverse scattering problem
[AD-A142634] N84-30894

ACCELERATION (PHYSICS)
Acceleration to a steady state for the Euler equations
[NASA-CR-172398] N84-29852
Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900

ACCELERATION PROTECTION
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868

ACCOUNTING
Ada (trademark) for business and other non-DOD applications
[AD-P003425] N84-30757
National Aeronautics and Space Administration's first-year implementation of the Federal Managers' Financial Integrity Act
[PB84-188770] N84-31044

ACCURACY
Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory N84-30432
Performance tests of the Solar Steam, Incorporated, 9-m deep-dish solar concentrating collector
[DE84-000079] N84-30535
An improved accuracy general remapping algorithm
[DE84-004320] N84-30837

ACEE PROGRAM
Energy efficient engine program contributions to aircraft fuel conservation
[NASA-TM-83741] N84-29876
ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures
[NASA-CP-2321] N84-29969
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970

ACID RAIN
Intermediate-range grid model and user's guide for atmospheric sulfur dioxide and sulfate concentrations and depositions: Wisconsin Power Plant Impact Study
[PB84-189257] N84-30556
European views on controlling acid rain
[PB84-194206] N84-30563
Atmospheric chemistry of H2O2, NO3, HONO, and HNO3: Influence of aqueous phase and heterogeneous processes
[PB84-183680] N84-30592

ACOUSTIC ATTENUATION
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30892
Active sound reduction: A study of recent developments and some future possibilities
[F83-06] N84-30899

ACOUSTIC EMISSION
Acoustical communications by means of small explosive charges
[DE84-008903] N84-30161

ACOUSTIC IMPEDANCE
Experimental study of noise transmission into a general aviation aircraft
[NASA-CR-172357] N84-30888

ACOUSTIC MEASUREMENT
Acoustical communications by means of small explosive charges
[DE84-008903] N84-30161
Residual stress measurements using shear-horizontal waves from electromagnetic acoustic transducers
[PB84-190636] N84-30171
Effect of turbulent boundary layer flow on measurement of acoustic pressure and intensity, revised
[AD-A142473] N84-30229
Scope for active noise abatement in vehicle diesel engines
[BLL-M-28767-(5825.4)] N84-30885
Thermoacoustic couple
[DE84-011296] N84-30895
Instrumentation for in-flight acoustic measurements in an engine intake
[NLR-MP-83060-U] N84-30898

ACOUSTIC SCATTERING
Analytical modeling of random thermal fluctuations in the NORDA (Naval Ocean Research and Development Activity) high-frequency sound scattering facility
[AD-A142520] N84-30830
Inverse scattering problem
[AD-A142634] N84-30894

ACOUSTIC VELOCITY
Undersea acoustic research
[AD-A142339] N84-30891

ACOUSTICS
Two-way unidirectional condenser microphone
[NHK-LABS-NOTE-297] N84-30175
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
Excitation of sound by light N84-30863

ACQUISITION
Improving system affordability
[AD-A142387] N84-31062

ACRYLIC RESINS
Impact of laser radiation on optical properties of polymer liquid crystal in phase transition range N84-30868

ACTIVATION
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29961
Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions
[AD-A142483] N84-29990

ACTIVATION ENERGY
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29963

ACTIVE CONTROL
Active attenuation of propeller blade passage noise
[NASA-CR-172386] N84-30886
Active sound reduction: A study of recent developments and some future possibilities
[F83-06] N84-30899

ADA (PROGRAMMING LANGUAGE)
Proceedings of the 2nd Annual Conference on Ada (Trademark) Technology
[AD-A142403] N84-30745
The Army Ada (trademark) education program
[AD-P003414] N84-30746
The US Army model Ada (trademark) training curriculum
[AD-P003415] N84-30747
Configuration management with the Ada (trademark) language
[AD-P003416] N84-30748
Learning the Ada (trademark) integrated environment
[AD-P003417] N84-30749
Teaching Ada (trademark) at the US Military Academy
[AD-P003418] N84-30750
Experiences in teaching Ada (trademark)
[AD-P003419] N84-30751
Teaching Ada (trademark) at Hampton Institute
[AD-P003420] N84-30752
The CECOM summer faculty research program
[AD-P003421] N84-30753
Teach Ada (trademark) as the student's first programming language?
[AD-P003422] N84-30754
An Ada (trademark) network: A real-time distributed computer system
[AD-P003423] N84-30755
DCP (Distributed software engineering control process): Experience in bootstrapping an Ada (trademark) environment
[AD-P003424] N84-30756
Ada (trademark) for business and other non-DOD applications
[AD-P003425] N84-30757

Experience with Ada (trademark) for the Graphical Kernel System
[AD-P003426] N84-30758
Military Computer Family Operating System: An Ada (trademark) application
[AD-P003427] N84-30759
An advanced host-target environment for the military computer family
[AD-P003428] N84-30760
Ada (trademark) tasking in numerical analysis
[AD-P003429] N84-30761
Ada (trademark) as a program design language: Have the major issues been addressed and answered?
[AD-P003430] N84-30762
Ada (trademark) design language concerns
[AD-P003431] N84-30763
Seeding the Ada (trademark) software components industry
[AD-P003432] N84-30764
Operating system interface for Ada (trademark) instructors
[AD-P003433] N84-30765
Guidelines for the design of large modular scientific libraries in Ada
[CWI-NM-N8401] N84-30792

ADAPTATION
A Taylor series in symmetry-adaptable functions
[AD-A142336] N84-30619

ADAPTIVE CONTROL
Crest: Crew escape technologies for the 1990's
N84-29944
Summaries of doctorate theses — man machine systems N84-30705
Some design guidelines and discrete-time adaptive controllers
[NASA-CR-173800] N84-30606

ADDITIVES
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets
N84-29963

ADHESION
Interfacial interaction and adhesion in composite materials N84-29961
Aspects of electroless nickel plating on molybdenum
[DE84-006434] N84-30057

ADHESIVE BONDING
Durability of adhesive bonds with ionic bonds at the interface — propellant binder adhesion N84-29960
Rapid adhesive bonding concepts
[NASA-TM-86256] N84-29966
Adhesive bond and composite strength screening system developmental study
[FZM-7164] N84-30073
The effects of strain rate and temperature on the fracture behavior of three structural adhesives
[AD-B084416] N84-30097

ADIABATIC CONDITIONS
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983
High-temperature lubricants for minimum-cooled diesel engines
[AD-A142426] N84-30078

ADRENAL GLAND
Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere
N84-30655

ADRENOCORTICOTROPIN (ACTH)
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682

ADSORPTION
Surface-enhanced Raman spectroscopy of electrochemically characterized interfaces. Transition-metal isothiocyanate adsorbates at silver adsorbates
[AD-A142407] N84-29986
Pulsed-laser atom-probe studies of surface chemical reactions
[DE84-012811] N84-30007
Thickener/fluid interaction in lubricating greases
[AD-A142276] N84-30076
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557
Optical second-harmonic generation for surface studies
[DE84-010718] N84-30958

AERIAL PHOTOGRAPHY
Interpreting spectra of sea surface aerial photographs
N84-30494
Cooperative line extraction of aerial photos and maps
N84-30502

Meteorological research and support for the MIZEX (Marginal Ice Zone Experiment) program
[AD-A142409] N84-30596

AEROACOUSTICS
Acoustic pressures emanating from a turbomachine stage
[NASA-TM-83734] N84-30224
The influence of a wind tunnel on helicopter rotational noise: Formulation of analysis
[NASA-TM-85962] N84-30687

AERODYNAMIC BALANCE
Magnetic suspension and balance system study
[NASA-CR-3802] N84-29888
Thrust balance efficiency measurements for a pulsed inductive thruster N84-29930

AERODYNAMIC CHARACTERISTICS
Implementation of uniform perturbation method for potential flow past axisymmetric and two-dimensional bodies
[NASA-CR-173829] N84-29851
Application of sensitivity analysis to aerodynamic parameters of a bank to turn missile
[AD-A141940] N84-29899

AERODYNAMIC STALLING
Flight characteristics of a manned, low-speed, controlled deep stall vehicle
[NASA-TM-86041] N84-29863

AERODYNAMICS
Some aerodynamic discoveries and related NACA/NASA research programs following World War 2
[NASA-TM-86258] N84-29847
APL/JHU free flight tests of the general purpose heat source module. Testing: 5-7 March 1984
[DE84-011065] N84-30948

AEROELASTICITY
Aeroelasticity in turbomachine-cascades
[AD-A141905] N84-29880
Two-dimensional and quasi three-dimensional experimental standard configurations for aeroelastic investigations in turbomachine-cascades
[AD-A141904] N84-30297

AERONAUTICAL ENGINEERING
Air Force Academy Aeronautics Digest
[AD-A142399] N84-29849
Theoretical and measured airflow about the Twin Otter wing
[AD-A141974] N84-29855
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-2] N84-30114

AERONOMY
Earth Observing System. Volume 1, part 2: Science and mission requirements. Working group report appendix
[NASA-TM-86129] N84-30433
Aeronomy N84-30449

AEROSOLS
Scientific analysis of existing data on aerosol dispersion and transport in a mountain valley
[AD-A142013] N84-30555
Effect of living conditions in confined space on formation of bacterial aerosol N84-30659
Laboratory for Energy Related Health Research
[DE84-000529] N84-30672
Growth and characterization of metal oxide whiskers for aerosol filtration
[DE84-011049] N84-31021

AEROSPACE ENGINEERING
The use of space laboratories for materials investigations, process engineering, and scientific purposes N84-29895

AEROSPACE ENVIRONMENTS
He-3 cooling systems for space
[NASA-TM-85985] N84-30226

AEROSPACE INDUSTRY
Scientific-Technical Facilities Department. Scientific-technical report
[ESA-TT-843] N84-31083

AEROSPACE MEDICINE
A survey of biodynamic test devices and methods
[AD-A142467] N84-29894
USSR report: Space Biology and Aerospace Medicine, vol. 18, no. 3, May - June 1984
[JPRS-USB-84-005] N84-30642
Use of vitamins during adaptation to high altitudes
N84-30643
Circulatory changes in orthostatic position in the presence of hyperthermia N84-30647
Blood plasma free amino acids under hypokinetic conditions N84-30648
Biological effects of millimeter-wave irradiation: Living bacterial organisms
[AD-A142474] N84-30670
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 261)
[NASA-SP-7011(261)] N84-30683
Increase in whole-body peripheral vascular resistance during three hours of air or oxygen prebreathing
[NASA-TM-58261] N84-30684

AEROSPACE SCIENCES
Space research in Belgium, 1982-1983 N84-31084

AEROSPACE SYSTEMS
Geokinetic effects on motion sensitive instrumentation, systems and facilities
[AD-A142682] N84-30575
Air force technical objective document FY 85
[AD-A141925] N84-31033

AFRICA
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512

AGING (METALLURGY)
Study of the fatigue crack propagation characteristics of YB-3 and YB-4 aeronautical organic glass
N84-30069

AGRICULTURE
Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411
An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414
Comparison of the information content of data from the LANDSAT-4 Thematic Mapper and the Multispectral Scanner N84-30420
Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422

AIR
Requirements for high-temperature air-cooled central receivers
[DE84-000081] N84-30534

AIR BREATHING ENGINES
Propulsion options for orbit-on-demand N84-29915

AIR CONDITIONING
Integrated gas-fired space heating/water heating system with electric air conditioning
[PB84-181999] N84-30138

AIR FLOW
Theoretical and measured airflow about the Twin Otter wing
[AD-A141974] N84-29855
Fire induced flows through room openings - flow coefficients
[PB84-176759] N84-30011
Atomization of liquid sheets in high pressure airflow
[NASA-TM-83731] N84-30223

AIR LAUNCHING
Development and fabrication of a graphite/epoxy motor case for air launch missile applications N84-29946

AIR POLLUTION
Analysis of particulates in the exhaust plume of a TF30 engine at military power
[AD-A142510] N84-29882
Evaluation of sampling methods for gaseous atmospheric samples
[PB84-190735] N84-30012
Scientific analysis of existing data on aerosol dispersion and transport in a mountain valley
[AD-A142013] N84-30555
Anti-tampering and anti-misfueling programs to reduce in-use emissions from motor vehicles
[PB84-185222] N84-30559
Sampling report for the study of personal CO (carbon monoxide) exposure
[PB84-181957] N84-30560
Air pollution effects on aquatic ecosystems: Summary of a symposium
[PB84-185214] N84-30562

AIR QUALITY
Evaluation of sampling methods for gaseous atmospheric samples
[PB84-190735] N84-30012
Cabin air quality
[GPO-29-522] N84-30702

AIR SAMPLING
Evaluation of sampling methods for gaseous atmospheric samples
[PB84-190735] N84-30012

AIR TO AIR MISSILES
Weapons file
[AD-A142506] N84-29867

AIR TRAFFIC
The changing airline industry: A status report through 1982
[GAO/RCED-83-179] N84-29858

AIR TRAFFIC CONTROL
Study of the FAA (Federal Aviation Administration) program to modernize maintenance operations
[AD-A142295] N84-29848

FAA (Federal Aviation Administration) air traffic activity FY 1983
[AD-A142493] N84-29861
Definition and layout of a traffic generator for an air traffic control simulation
[DFVLR-FB-84-15] N84-29862
User's manual for a fuel-conservative descent planning algorithm implemented on a small programmable calculator
[NASA-TM-86275] N84-29871

AIR WATER INTERACTIONS
Oceanic transport N84-30444
Sea ice N84-30446
Observational requirements and measurement systems concepts N84-30452
Results of ocean-atmosphere interaction studies in West Atlantic N84-30461
Spatial distribution of advective heat influxes in atmosphere over Northern Hemisphere and its relationship to heat influxes from ocean N84-30462
Mechanisms of interannual ocean-atmosphere interactions
[NASA-CR-173834] N84-30595
Global Biology Research Program: Biogeochemical Processes in Wetlands
[NASA-CP-2316] N84-30665
Executive summary: Background N84-30666
Geographic distribution of wetland parameters: The foundation of a data base N84-30667
Excitation of quasi-static magnetic fields in axial structures N84-30673

AIRBORNE/SPACEBORNE COMPUTERS
User's manual for a fuel-conservative descent planning algorithm implemented on a small programmable calculator
[NASA-TM-86275] N84-29871
Proton-induced single event upsets in the SBP9989 microprocessor
[AD-A142448] N84-30724

AIRCRAFT
Worldwide flight and ground-based exposure of composite materials N84-29971

AIRCRAFT COMPARTMENTS
Experimental study of noise transmission into a general aviation aircraft
[NASA-CR-172357] N84-30688

AIRCRAFT CONSTRUCTION MATERIALS
ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures
[NASA-CP-2321] N84-29969
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970
Worldwide flight and ground-based exposure of composite materials N84-29971
Postbuckling behavior of graphite-epoxy panels
N84-29976
Studies of noise transmission in advanced composite material structures N84-29977
Adhesive bond and composite strength screening system developmental study
[FZM-7184] N84-30073
Air force technical objective document FY 85
[AD-A141925] N84-31033

AIRCRAFT CONTROL
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29879

AIRCRAFT DESIGN
Some aerodynamic discoveries and related NACA/NASA research programs following World War 2
[NASA-TM-86256] N84-29847
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29879
Review and comparison of discrete and continuous gust methods for the determination of airplane design loads
[NLR-TR-82134-U] N84-29886
ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures
[NASA-CP-2321] N84-29969
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970
Worldwide flight and ground-based exposure of composite materials N84-29971
Impact dynamics research on composite transport structures N84-29975
Postbuckling behavior of graphite-epoxy panels
N84-29976
Studies of noise transmission in advanced composite material structures N84-29977
Improved methods of vibration analysis of pretwisted, airfoil blades
[NASA-TM-83735] N84-30329

AIRCRAFT ENGINES
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29879

AIRCRAFT EQUIPMENT
Decision analysis model for passenger-aircraft fire safety with application to fire-blocking of seats
[AD-A142477] N84-29659
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868

AIRCRAFT HAZARDS
Cabin air quality
[GPO-29-522] N84-30702

AIRCRAFT LANDING
FAA (Federal Aviation Administration) air traffic activity FY 1983
[AD-A142493] N84-29861

AIRCRAFT MAINTENANCE
Durability methods development, volume 7
[AD-A142400] N84-29865

AIRCRAFT MANEUVERS
Improved pilot model for application to a computer flight testing program for helicopters
[NLR-MP-83052-U] N84-29889

AIRCRAFT NOISE
Studies of noise transmission in advanced composite material structures N84-29977
Active attenuation of propeller blade passage noise
[NASA-CR-172386] N84-30686

AIRCRAFT PERFORMANCE
User's manual for a fuel-conservative descent planning algorithm implemented on a small programmable calculator
[NASA-TM-86275] N84-29871

AIRCRAFT POWER SUPPLIES
Rapid electrolyte exchange procedures for 22 AH nickel-cadmium celgard cells
[AD-A142004] N84-30176

AIRCRAFT SAFETY
History of aircraft escape system propulsion
N84-29941
Propulsion in a life-saving role for ACES 2
N84-29942
Crest: Crew escape technologies for the 1990's
N84-29944
Energy management for crew escape systems
N84-29945

AIRCRAFT STRUCTURES
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures
[AD-A142424] N84-29866
Stress-corrosion crack-growth study of titanium alloy Ti-6Al-4V exposed to Freon PCA and nitrogen tetroxide MON-1 N84-29923
ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures
[NASA-CP-2321] N84-29969
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970
Worldwide flight and ground-based exposure of composite materials N84-29971

AIRFOIL PROFILES
Implementation of uniform perturbation method for potential flow past axisymmetric and two-dimensional bodies
[NASA-CR-173829] N84-29851

AIRFOILS
Acceleration to a steady state for the Euler equations
[NASA-CR-172398] N84-29852
Analysis of airfoil transitional separation bubbles
[NASA-CR-3791] N84-29854
Grid-size reduction in flow calculations on infinite domains by higher-order far-field asymptotics in numerical boundary conditions
[NLR-MP-83029-U] N84-30253

AIRFRAMES
Durability methods development, volume 7
[AD-A142400] N84-29865
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures
[AD-A142424] N84-29866
Effects of variations in coldworking repair procedures on flaw growth and structural life
[AD-A141966] N84-30336

AIRLINE OPERATIONS
The changing airline industry: A status report through 1982
[GAO/RCED-83-179] N84-29858

AIRPORT PLANNING
Federal Aviation Administration's system for prioritizing airport grants
[PB84-181650] N84-29693

AIRPORTS
Report of accomplishments under the airport improvement program
[AD-A142444] N84-29689
Directional extreme wind speed data for the design of buildings and other structures
[PB84-178647] N84-30139

ALABAMA
Water resources data for Alabama, water year 1982
[PB84-183250] N84-30523

ALASKA
Vertebrate behavior and ecology
[DE84-007318] N84-30673

ALCOHOLS
Promotion effects on the synthesis of higher alcohols
[DE84-009916] N84-30109

ALGAE
A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425
Salinity and temperature effects on photosynthesis and organic carbon release rates by selected benthic macroalgae
[PB84-163146] N84-30674

ALGORITHMS
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157
Parallelism in manipulator dynamics. Revision
[AD-A142515] N84-30299
TM failed detectors data replacement N84-30382
Bias removal for conventional magnetotelluric data
[DE84-012189] N84-30579
Computational method for thermoviscoelasticity with application to rock mechanics
[DE84-003087] N84-30585
Computational experiments with a feature based stereo algorithm
[AD-A142549] N84-30687
A minimum area VLSI (Very Large Scale Integrated) architecture for O(logn) time sorting
[AD-A142414] N84-30723
Modifications to iterative recursion unfolding algorithms and computer codes to find more appropriate neutron spectra
[AD-A142475] N84-30775
Three image compression algorithms for Compression and Decompression of Imaging Sensor Signals (CADISS)
[NLR-MP-83027-U] N84-30791
Two algorithms for the contact problem in elastostatics, 1982
[PB83-147678] N84-30793
Canonical realizations of completely regular modular computing networks
[AD-A142010] N84-30802
Some design guidelines and discrete-time adaptive controllers
[NASA-CR-173800] N84-30808
Smoothed local symmetries and their implementation
[AD-A142489] N84-30811
A numerical algorithm for chained aggregation and modified chained aggregation
[AD-A142394] N84-30822
New algorithms for near neighbor searching
[AD-A142404] N84-30824
The complexity of sorting on distributed systems
[AD-A142415] N84-30825
An improved accuracy general remapping algorithm
[DE84-004320] N84-30837
Electron motion in solenoidal magnetic fields using a first order symplectric integration algorithm
[DE84-011341] N84-30910

ALIGNMENT
Nova laser alignment control system
[DE84-010992] N84-30288
Automatic beam centering at the SSC interaction regions
[DE84-010710] N84-30902
High-spin gamma-ray spectroscopy
[DE84-010716] N84-30929

ALKALIES
Intergranular failures of Alloy 600 in high temperature caustic environments
[DE84-010690] N84-30032
Corrosion of unalloyed steels in different alkaline solutions at high temperatures and under high pressures
[S/T-REPT-VOL-1-NO-1] N84-30060

ALKALINE BATTERIES
Secondary alkaline batteries
[DE84-010963] N84-30191

ALKYLATION

Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review [DE84-009432] N84-30557

ALLOCATIONS

Appropriate Technology Small Grants Program evaluation, volume 1: Executive summary [DE84-010675] N84-31038

Appropriate Technology Small Grants Program evaluation, volume 2 [DE84-010674] N84-31039

ALLOYS

Characterization of the microstructures of various materials [AD-A141946] N84-30017

Application of transverse-section analytical electron microscopy to the study of oxidation of metal alloys [DE84-008415] N84-30049

High resolution electron microscopy studies of the early stages of decomposition in alloys and ceramics [DE84-020802] N84-30067

ALLUVIUM

Preliminary evaluation of TM for soils information N84-30427

ALTIMETERS

SEASAT observations of lithospheric flexure N84-30463

SEASAT altimetry for surface height of inland seas N84-30472

ALTITUDE

A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images [AD-A142019] N84-30512

ALUMINUM

Survey and analysis of materials research and development at selected federal laboratories [DE84-008604] N84-29967

Impact dynamics research on composite transport structures N84-29975

Potential-determining reactions during pitting corrosion of aluminum [DE84-007695] N84-30031

Corrosion of 5083 aluminum by aqueous sodium sulfate [DE84-012033] N84-30045

Galvanic corrosion of an aluminum O-ring [DE84-011345] N84-30047

Sulfidation- and oxidation-resistant ferritic stainless steel containing aluminum [PB84-189521] N84-30101

Development of hydrocyclones for aluminum/air battery applications [DE84-011403] N84-30197

ALUMINUM ALLOYS

Application of electrochemical and mechanical impedance measurements to corrosion induced failures [AD-A142466] N84-30021

Fatigue behavior of long and short cracks in wrought and powder aluminum alloys [AD-A142609] N84-30024

Ductile aluminide alloys for high temperature applications [DE84-011037] N84-30038

Method of enhancing selective isotope desorption from metals [DE84-011031] N84-30044

Liquid metal infiltration of an aluminum alloy into a packed column of B4C particles [DE84-012136] N84-30055

Influence of temperature on the Delta K sub th and da/dN of LY-12CS aluminum alloy N84-30067

ALUMINUM OXIDES

Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4 [DE84-012336] N84-30052

Electrolytic degradation of lithia-stabilized polycrystalline beta-alumina [DE84-008966] N84-31027

AMBIENT TEMPERATURE

Ambient temperature testing of the G-tunnel heated block [DE84-009927] N84-30945

AMINO ACIDS

Blood plasma free amino acids under hypokinetic conditions N84-30648

Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30660

AMINES

Surface-enhanced Raman spectroscopy of electrochemically characterized interfaces. Transition-metal isothiocyanate adsorbates at silver adsorbates [AD-A142407] N84-29986

AMMONIA

Effect of high ammonia content in pressure chamber atmosphere on human adrenocortical system function N84-30658

AMORPHOUS SEMICONDUCTORS

Chemical vapor deposition of amorphous semiconductor films [DE84-004489] N84-31026

AMPLIFICATION

Lossless symmetric TEM line IMPATT diode power combiners [AD-A142599] N84-30187

Use of Peltier effect for small signal amplification and conversion N84-30664

AMPLIFIERS

Reflex ring laser amplifier system [DE84-010674] N84-30282

Use of Peltier effect for small signal amplification and conversion N84-30664

AMPLITUDE MODULATION

Description of a microwave system for the measurement of close to carrier AM and FM noise spectra [LEOK-TR-1984-04] N84-30168

ANALOG COMPUTERS

Europe approaches chaos with electrical circuits [AD-A142065] N84-30179

ANALOG TO DIGITAL CONVERTERS

Reports on cartography and geodesy. Series 1: Original reports, number 92 [ISSN-0469-4236] N84-30495

Application of FASTRAK by Skandinavisk Autodigitaliserings AB (SADAB) cartographic service N84-30496

ANALYTICAL CHEMISTRY

Solving corrosion problems with surface analysis [DE84-006652] N84-30025

ANECHOIC CHAMBERS

The Technical University of Denmark (TUD)-ESA spherical near field antenna test facility, Lyngby, Denmark [ESA-BR-19] N84-29690

ANEMOMETERS

On-site analysis to assess the feasibility of wind power [DE84-009762] N84-30606

ANGLE OF ATTACK

Flight characteristics of a manned, low-speed, controlled deep stall vehicle [NASA-TM-86041] N84-29863

ANGLES (GEOMETRY)

Small-angle method in study of single and multiple scattering N84-30492

ANGULAR ACCELERATION

Support structures for large infrared telescopes [NASA-CR-3800] N84-30328

ANGULAR DISTRIBUTION

Reactive resonance and angular distributions in the rotating linear model [DE84-011354] N84-30919

ANIMALS

NASA space biology accomplishments, 1983-84 [NASA-TM-86654] N84-30664

Vertebrate behavior and ecology [DE84-007318] N84-30673

ANISOTROPY

Noncubic magnetic anisotropy in YSmLuCaFeGe garnet films N84-30669

Acceleration of ions and electrons by wave-particle interactions [AD-A142341] N84-30900

ANNEALING

Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4 [DE84-012336] N84-30052

Low cost, sprayed CuInSe2 solar cell research [DE84-010480] N84-30533

Intelligent optical design program [DE84-010071] N84-30813

ANNIHILATION REACTIONS

Nuclear and particle physics aspects of hyperon and antinucleon interactions [DE84-010793] N84-30905

ANNUAL VARIATIONS

Middle atmospheric science N84-30448

Changes in Earth's rotation rate caused by zonal tide and their manifestations in atmospheric pressure field N84-30487

US average wind power by season [DE84-012214] N84-30613

ANODES

Rigid indented cylindrical cathode for X-ray tube [DE84-011093] N84-30204

ANOMALIES

A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979 [AD-A142546] N84-30631

ANTENNA ARRAYS

An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array [AD-A142478] N84-30159

Propagation loss in electrostatically variable SAW delay lines [AD-A142433] N84-30183

Nulling in array patterns with orthogonal analytic cancellation beams [AD-A142719] N84-30188

ANTENNA DESIGN

An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array [AD-A142478] N84-30159

ANTENNA RADIATION PATTERNS

Nulling in array patterns with orthogonal analytic cancellation beams [AD-A142719] N84-30188

Finite-element-analysis of fields radiated from ICRF antenna [IPPJ-675] N84-30965

ANTENNAS

An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array [AD-A142478] N84-30159

Computer-generated movie on the short pulse electromagnetic behavior of wire objects [DE84-012032] N84-30162

Performance of Beverage antennas at low angles [DE84-011163] N84-30164

ANTIMONY ALLOYS

Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy [DE84-011458] N84-30028

ANTISEPTICS

Operation and maintenance of selected ozone and ultraviolet disinfection systems [PB84-180124] N84-30719

APERTURES

Shock wave absorber having apertured plate [DE84-011271] N84-30345

Dual aperture dipole magnet with second harmonic component [DE84-011305] N84-30856

The Spot of Arago and its role in aberration analysis [AD-A141983] N84-30952

APOGEE BOOST MOTORS

Dual mode propulsion system engine testing for INTELSAT N84-29913

APPLICATIONS OF MATHEMATICS

New algorithms for near neighbor searching [AD-A142404] N84-30824

National Science Foundation, volume 1 [PB84-193234] N84-31061

APPROACH CONTROL

FAA (Federal Aviation Administration) air traffic activity FY 1983 [AD-A142493] N84-29861

APPROPRIATIONS

Report of accomplishments under the airport improvement program [AD-A142444] N84-29869

Federal funds for research and development, fiscal years 1981, 1982 and 1983, volume 31 [PB84-189596] N84-31045

Federal funds for research and development, fiscal years 1982, 1983 and 1984. Volume 32: Detailed statistical tables [PB84-189604] N84-31046

APPROXIMATION

Approximation techniques for parameter estimation and feedback control for distributed models of large flexible structures [NASA-CR-172411] N84-29903

Computer-generated movie on the short pulse electromagnetic behavior of wire objects [DE84-012032] N84-30162

Accuracy of one approximate method for computing radiative fluxes in presence of broken clouds N84-30491

Small-angle method in study of single and multiple scattering N84-30492

A retrievable recipe for inverse t [AD-A142557] N84-30829

Calculation of ballistic focusing of ion beams [DE84-012870] N84-30934

Renormalized action improvements [DE84-011810] N84-31029

AQUATIC PLANTS

Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data
N84-30419

Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424

AQUEOUS SOLUTIONS

Intergranular failures of Alloy 600 in high temperature caustic environments
[DE84-010890] N84-30032

Mechanisms of intergranular failures in Alloy 600 in high temperature environments
[DE84-010514] N84-30033

AQUICULTURE

Air pollution effects on aquatic ecosystems: Summary of a symposium
[PB84-185214] N84-30562

AQUIFERS

Estimation of recharge in a small southern Arizona basin by means of hydrological, hydrochemical, and environmental isotope data
[PB84-159672] N84-30527

ARC MELTING

Tantalum-copper alloy and method for making
[DE84-011061] N84-30037

ARC WELDING

Characterization of submerged-arc and gas-metal-arc weldments in hY-100 steel
[AD-A141939] N84-30298

ARCHITECTURE

Daylight availability as a function of atmospheric conditions
[DE84-007973] N84-30609

Electrochromic materials for the regulation of solar energy transmission through windows
[DE84-012165] N84-31029

ARCHITECTURE (COMPUTERS)

Research in VLSI (Very Large Scale Integration) systems
[AD-A142511] N84-30185

Parallelism in manipulator dynamics. Revision
[AD-A142515] N84-30299

Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense
[AD-A141982] N84-30721

A minimum area VLSI (Very Large Scale Integrated) architecture for O(logn) time sorting
[AD-A142414] N84-30723

Supercomputers: The next ten years. A user's view
[DE84-011072] N84-30727

Logic machine architecture inference mechanisms: Layer 2 user reference manual release 2.0
[DE84-012115] N84-30728

An operating system and memory switch for the S-1 computer
[DE84-013094] N84-30731

Integrated Computer-Aided Manufacturing (ICAM) architecture, part 3. Volume 5: Composite function model of manufacture product (MFG0)
[AD-A142337] N84-30766

Integrated Computer-Aided Manufacturing (ICAM) architecture. Part 3, volume 4: Composite information model of design product (DES 1)
[AD-A142447] N84-30774

A summary of fault tolerant computing research at Carnegie Mellon University
[AD-A142707] N84-30777

Review of NASA's (National Aeronautics and Space Administration) Numerical Aerodynamic Simulation Program
[NASA-CR-173842] N84-30799

Canonical realizations of completely regular modular computing networks
[AD-A142010] N84-30802

Current research in parallel microprocessing systems at Los Alamos
[DE84-011342] N84-30804

Design issues in parallel architectures for artificial intelligence
[AD-A142482] N84-30809

The complexity of sorting on distributed systems
[AD-A142415] N84-30825

ARGON

Thrust balance efficiency measurements for a pulsed inductive thruster N84-29930

Resonance ionization spectroscopy of argon, krypton and xenon using vacuum ultraviolet light
[DE84-011655] N84-30006

ARGON LASERS

Capillary separations with calorimetric absorbance detection
[DE84-012466] N84-30291

ARIZONA

Estimation of recharge in a small southern Arizona basin by means of hydrological, hydrochemical, and environmental isotope data
[PB84-159672] N84-30527

ARKANSAS

An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414

Preliminary evaluation of Thematic Mapper image data quality N84-30415

Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422

A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425

Preliminary evaluation of TM for soils information
N84-30427

Water resources data for Arkansas, water year 1982
[PB84-181296] N84-30522

ARMED FORCES (UNITED STATES)

Evaluation of U.S. Coast Guard forward-looking airborne radars
[AD-A142417] N84-30156

The Army Ada (trademark) education program
[AD-P003414] N84-30746

The US Army model Ada (trademark) training curriculum
[AD-P003415] N84-30747

A field study of Air Force organization structures
[AD-A142389] N84-31035

A model of inter-organizational influences on organizational processes
[AD-A142450] N84-31037

ARMOR

Thermomechanical processing and texture development in Ni-Cr-Mo and Mn-Mo-B armor steels
[AD-A142352] N84-30020

ARRAYS

Gate arrays — integrated circuits
[AD-B082958] N84-30214

A theory for cross-coupling in ultrasonic transducer arrays
[DE84-010327] N84-30259

ARSENIC COMPOUNDS

Impact of weak electric field on photoconductivity of modified vitreous As2Se3 N84-30867

ARTERIES

Nomogram for demonstrating change in central venous and pulmonary artery pressure during decompression of different parts of the body N84-30660

ARTIFICIAL CLOUDS

Modification of the surface temperature by an artificial cirrus cloud
[DE84-011387] N84-30611

ARTIFICIAL INTELLIGENCE

Initial insights on robotics
[DE84-010768] N84-30302

Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense
[AD-A141982] N84-30721

Logic machine architecture inference mechanisms: Layer 2 user reference manual release 2.0
[DE84-012115] N84-30728

An algorithm for parsing flow graphs
[AD-A142440] N84-30773

Design issues in parallel architectures for artificial intelligence
[AD-A142482] N84-30809

Artificial intelligence and robotics
[AD-A142488] N84-30810

Design philosophy for reliable systems, including control
[DE84-012681] N84-30814

Automated planning for intelligent machines in energy-related applications
[DE84-011666] N84-30815

The curvature primal sketch
[AD-A142460] N84-30827

ARTIFICIAL SATELLITES

Proton-induced single event upsets in 71 Earth-satellite environments
[AD-A142435] N84-30771

ASCENT TRAJECTORIES

A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems
[AD-A141136] N84-29898

ASHES

In-stream distribution and hydraulic and ecological effects of volcanic ash from Mount St. Helens eruption
[PB84-169382] N84-30526

Chemical evolution of a high-level magma system: The Black Mountain Volcanic Center, Southern Nevada
[DE84-013321] N84-30587

ASSURANCE

Software quality assurance programs: Key elements of concern in selected commercial approaches
[DE84-009486] N84-30785

ASTEROIDS

The occultation of AG+29 deg 398 by 93 Minerva
[NASA-CR-173827] N84-31066

Cosmic bombardment
[DE84-011402] N84-31071

ASTRONOMICAL OBSERVATORIES

Activities in astronomy
[ISSN-0531-4496] N84-31067

ASTRONOMICAL SPECTROSCOPY

Studies of X-ray clusters of galaxies/intergalactic plasmas
[NASA-CR-173825] N84-31068

ASTRONOMY

Solar-geophysical data number 473. Part 2: (Comprehensive reports) data for July 1983, March 1981 and miscellanea
[PB84-180629] N84-31074

ASYMMETRY

Weak corrections to the e+e-yields mu+mu-asymmetry
[DO-TH-83-16] N84-30939

ASYMPTOTIC METHODS

Grid-size reduction in flow calculations on infinite domains by higher-order far-field asymptotics in numerical boundary conditions
[NLR-MP-83029-U] N84-30253

ATLANTIC OCEAN

An objective analysis technique for extrapolating tidal fields N84-30471

Results of ocean-atmosphere interaction studies in West Atlantic N84-30481

US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141810] N84-30627

Continental shelf processes affecting the oceanography of the South Atlantic Bight
[DE84-010113] N84-30635

Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 2: Mid-Atlantic region
[PB84-187947] N84-30640

ATMOSPHERIC ATTENUATION

The evaluation of prediction models for microwave attenuation by rainfall
[PB84-182104] N84-30170

Evaluation of the radiometric integrity of LANDSAT-4 Thematic Mapper band 6 data N84-30375

Resonance absorption of narrow-band laser radiation by atmospheric gases N84-30493

ATMOSPHERIC CHEMISTRY

Tropospheric chemistry N84-30441

Middle atmospheric science N84-30446

Atmospheric chemistry of H2O2, NO3, HONO, and HNO3: Influence of aqueous phase and heterogeneous processes
[PB84-183680] N84-30592

National Center for Atmospheric Research
[PB84-183581] N84-30621

ATMOSPHERIC CIRCULATION

Global hydrologic cycle N84-30434

US average wind power by season
[DE84-012214] N84-30613

Variability of the convection field pattern in South Florida and its relationship to the synoptic flow
[PB84-177393] N84-30623

ATMOSPHERIC COMPOSITION

Global biogeochemistry: An overview N84-30435

Biogeochemical considerations N84-30436

Intermediate-range grid model and user's guide for atmospheric sulfur dioxide and sulfate concentrations and depositions: Wisconsin Power Plant Impact Study
[PB84-189257] N84-30556

Trace constituants measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565

Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86265] N84-30566

Response to W. W. Kellogg's Carbon Dioxide and Climatic Change
[DE84-010986] N84-30577

National Center for Atmospheric Research
[PB84-183581] N84-30621

ATMOSPHERIC CORRECTION

Range corrections for airborne radar - A joint STARS study
[AD-A142363] N84-30154

LANDSAT-4 Thematic Mapper calibration and atmospheric correction N84-30384

ATMOSPHERIC EFFECTS
Range corrections for airborne radar - A joint STARS study
[AD-A142369] N84-30154
On molecular scattering in the terrestrial atmosphere: An empirical formula for its calculation in the homosphere
[AERONOMICA-ACTA-A-284-1984] N84-30584
National Center for Atmospheric Research
[PB84-189581] N84-30621
Analytic techniques for estimating visible image transmission properties of the atmosphere
[AD-A142524] N84-30954
ATMOSPHERIC ENTRY
STS-13 (41-C) BET products
[NASA-CR-172350] N84-29901
ATMOSPHERIC MODELS
A method for three-dimensional modeling of wind-shear environments for flight simulator applications
[NASA-TM-85869] N84-29857
Sea ice N84-30446
Scientific analysis of existing data on aerosol dispersion and transport in a mountain valley
[AD-A142013] N84-30555
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86265] N84-30586
Geophysical plasmas and atmospheric modeling
[AD-A142573] N84-30572
Mechanisms of interannual ocean-atmosphere interactions
[NASA-CR-173834] N84-30595
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596
ATMOSPHERIC OPTICS
Accuracy of one approximate method for computing radiative fluxes in presence of broken clouds
N84-30491
Interpreting spectra of sea surface aerial photographs
N84-30494
The DFVLR contrast transmittance model SCOTRAN-program system: Description and operating instruction
[DFVLR-FB-84-18] N84-30589
ATMOSPHERIC PHYSICS
USSR report: Earth sciences
[JPRS-UES-84-006] N84-30479
Results of ocean-atmosphere interaction studies in West Atlantic N84-30481
Changes in Earth's rotation rate caused by zonal tide and their manifestations in atmospheric pressure field
N84-30487
ATMOSPHERIC PRESSURE
USSR report: Earth sciences
[JPRS-UES-84-006] N84-30479
Dependence of blood coagulating and fibrinolytic systems on functional state of lysosomal system of neutrophil leukocytes during exposure of the body to low barometric pressure N84-30661
ATMOSPHERIC SCATTERING
Small-angle method in study of single and multiple scattering N84-30492
Analytic techniques for estimating visible image transmission properties of the atmosphere
[AD-A142524] N84-30954
ATMOSPHERIC SOUNDING
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder
[NOAA-TM-NESDIS-6] N84-30571
ATMOSPHERIC TEMPERATURE
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder
[NOAA-TM-NESDIS-6] N84-30571
Meteorological research and support for the MIZEX (Marginal Ice Zone Experiment) program
[AD-A142409] N84-30598
ATMOSPHERIC TIDES
Monthly mean determination of the solar semidiurnal surface pressure oscillation at Batavia from 1866 through 1944
[PB84-184795] N84-30593
ATOMIC ENERGY LEVELS
Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922
ATOMIC PHYSICS
Institutional supporting research highlights in physics and mathematics, fiscal year 1983
[DE84-011025] N84-30855
Accelerator-based atomic physics experiments with photon and ion beams
[DE84-010789] N84-30928
ATOMIC SPECTRA
Trace analysis in quartz
[AD-A142425] N84-29968
ATOMIC STRUCTURE
Theory of the electronic structure and optical properties of organic solids: Exciton effects
[AD-A142544] N84-29993
Ultraviolet light absorbers having 2 different chromophors in the same molecule
[DE84-011279] N84-30000
Investigation of the structure of photosynthetic reaction centers
[DE84-012475] N84-30005
ATOMIZERS
Improved graphite furnace atomizer
[DE84-011091] N84-30263
ATOMS
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29981
The transfer of atoms, ions and molecular groups in solution. Part 2: Tunnelling between harmonic wells
[AD-A142334] N84-29982
ATTACK AIRCRAFT
Weapons file
[AD-A142506] N84-29867
ATTENUATION
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557
ATTITUDE CONTROL
The 1984 JANNAF Propulsion Meeting, volume 1
[AD-A142652] N84-29906
Low thrust bipropellant engine development
N84-29912
Dual mode propulsion system engine testing for INTELSAT N84-29913
Tracking and Data Relay Satellite launch recovery mission N84-29918
A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919
An integrated space station propulsion system
N84-29933
Thrust level requirements for space station on-orbit propulsion N84-29935
AUDIO EQUIPMENT
A method of measuring distortion noise in digital audio equipment
[NHK-LABS-NOTE-299] N84-30174
Two-way unidirectional condenser microphone
[NHK-LABS-NOTE-297] N84-30175
AUDIOLOGY
Audiometric configurations and repeatability in noise-induced hearing loss
[ISVR-TR-123] N84-30694
AUDIOMETRY
Audiometric configurations and repeatability in noise-induced hearing loss
[ISVR-TR-123] N84-30694
AUDITORY DEFECTS
Audiometric configurations and repeatability in noise-induced hearing loss
[ISVR-TR-123] N84-30694
AUDITORY SIGNALS
On measuring the acoustic intensity of hydroacoustic sources
[AD-A142484] N84-30693
AUGMENTATION
Enhancements to the codata definition language
[DE84-010579] N84-30783
AURORAL ELECTROJETS
High-latitude ionospheric irregularities
[AD-A142648] N84-30573
AURORAL ZONES
Geophysical plasmas and atmospheric modeling
[AD-A142573] N84-30572
First observations of 140 MHz plasma line backscatter during healthy experiments at Tromsoe
[UIO-SR-84-02] N84-30588
AURORAS
A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30568
AUTOMATIC CONTROL
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868
Energy management for crew escape systems
N84-29945
Microprocessor automation for the Dynaflect Deflection Measuring System
[PB84-180413] N84-30135
Analyzer for determining helium-4 in the part-per-billion range
[PB84-189554] N84-30272
Control computer and automation subsystem equipment in Delfin Facility N84-30880
Automatic beam centering at the SSC interaction regions
[DE84-010710] N84-30902
AUTOMATIC TEST EQUIPMENT
Experimental research facility for creep-rupture testing of tantalum alloy T-111
[DE84-012030] N84-30036
AUTOMATION
Strategies for analytical applications and implementation of a multi-purpose laboratory robot
[DE84-012379] N84-30314
AUTOMOBILE FUELS
Anti-tampering and anti-misfueling programs to reduce in-use emissions from motor vehicles
[PB84-165222] N84-30559
AUTOMOBILES
Orientation of ergonomic aspects of the Universal Dynamometer Device — vehicle testing
[IZF-1983-25] N84-30315
Anti-tampering and anti-misfueling programs to reduce in-use emissions from motor vehicles
[PB84-165222] N84-30559
AUTOROTATION
Numerical simulation of autorotation N84-30118
AUXILIARY POWER SOURCES
Space Shuttle Orbiter improved auxiliary power unit
N84-29965
AVAILABILITY
Sunlight probability data for select cities in the US
[DE84-000006] N84-30606
AVALANCHE DIODES
Lossless symmetric TEM line IMPATT diode power combiners
[AD-A142599] N84-30187
AVIONICS
Improvements to software maintenance methods in real time embedded aviation flight systems
[AD-A141949] N84-30742
AVOIDANCE
Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657
AXIAL FLOW
Non-inertial flow of dilute polymer solutions in a sudden contraction
[BLL-WH-558-(909A.9F)] N84-30221
AXISYMMETRIC BODIES
Implementation of uniform perturbation method for potential flow past axisymmetric and two-dimensional bodies
[NASA-CR-173829] N84-29851
AXISYMMETRIC FLOW
Random-choice solutions for two-dimensional and axisymmetric supersonic flows N84-30115
AZIDES (ORGANIC)
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets
N84-29963

B

BACKSCATTERING
Backscatter measurements on snow covered terrain at 94 GHz — radar
[REPT-4-84] N84-30144
Nordsee radar backscatter measurements data report
[AD-A141914] N84-30148
Study of stimulated Brillouin and Raman scattering
[DE84-011260] N84-30266
First observations of 140 MHz plasma line backscatter during healthy experiments at Tromsoe
[UIO-SR-84-02] N84-30588
BACTERIA
Effect of living conditions in confined space on formation of bacterial aerosol N84-30659
BAINITIC STEEL
A study of the tempering transformation of retained austenite in isothermal quenching structures, bainite tempered embrittlement N84-30065
BALLISTICS
Calculation of ballistic focusing of ion beams
[DE84-012870] N84-30934
BAND STRUCTURE OF SOLIDS
Theory of the electronic structure and optical properties of organic solids: Exciton effects
[AD-A142544] N84-29993
BANDWIDTH
Fundamental and harmonic emission in interplanetary type 2 radio bursts
[NASA-TM-86099] N84-31079
BARIUM ION CLOUDS
Evolution of structure in the PLACES barium clouds
[DE84-010996] N84-30583

BAROTRAUMA
Ultrasonography of canine soft tissues during decompression N84-30653
BARS
Local bond stress-slip relationships of deformed bars under generalized excitations: Experimental results and analytical model
[PB84-192848] N84-30355
BASIC (PROGRAMMING LANGUAGE)
Burroughs Corporation B1000 system interactive, BASIC release 11.0
[PB84-180215] N84-30794
Data General Corporation ECLIPSE MV/8000, MP-BASIC revision 3.00
[PB84-181361] N84-30796
United Information Services, Inc. CDC Cyber 175, super BASIC version 1.0
[PB84-181367] N84-30797
BATTERY CHARGERS
Rechargeable zinc batteries
[DE84-008947] N84-30192
Effect of charging methods on battery electrodes
[DE84-010287] N84-30196
BEAM CURRENTS
Comparison of some SSC beam parameters for pp and anti pp
[DE84-010729] N84-30908
A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912
BEAM INJECTION
A 6.5 Tesla SSC lattice example
[DE84-010719] N84-30858
High-current, low-energy synchrotrons and compressor rings
[DE84-012104] N84-30906
RFQ radial matching sections and fringe fields
[DE84-011408] N84-30920
Impurity characteristics of TMX-U
[DE84-012413] N84-30932
BEAM INTERACTIONS
Automatic beam centering at the SSC interaction regions
[DE84-010710] N84-30902
BEAM PLASMA AMPLIFIERS
Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30881
BEAMS
Nulling in array patterns with orthogonal analytic cancellation beams
[AD-A142719] N84-30188
BEAMS (RADIATION)
Recommendations for on-site vibration standards
[DE84-011756] N84-30207
X-ray beam finder
[DE84-011100] N84-30916
BEAMS (SUPPORTS)
Tensile crack exposure tests. Statistical analysis of the long-term durability of series B beams
[AD-A141955] N84-30335
BEARING (DIRECTION)
US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141810] N84-30627
A finite element method for treating nearly one way wave propagation
[DE84-010294] N84-30899
BEARINGS
Summary of drive-train component technology in helicopters
[NASA-TM-83726] N84-30294
BEHAVIOR
Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657
Vertebrate behavior and ecology
[DE84-007318] N84-30673
USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-84-016] N84-30675
Organophosphate toxicity: Genetics, receptors, and antidotes
[AD-A141059] N84-30685
BELGIUM
Space research in Belgium, 1982-1983 N84-31084
BENDING
J-integral tearing instability analysis for 8-inch diameter ASTM A106 steel pipe
[AD-A142589] N84-30023
BIAS
HgCdTe surface and defect study program
[AD-A142342] N84-31010
BIBLIOGRAPHIES
High-temperature alloys: Theory and design
[DE84-010428] N84-30029
Bibliography of Soviet laser developments, number 64, March -April 1983
[AD-A141906] N84-30275
Publications — bibliographies N84-30594
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 261)
[NASA-SP-7011(261)] N84-30683
Inverse scattering problem
[AD-A142634] N84-30694
Selected bibliography of solar thermal literature. Volume 1: Bibliography
[DE84-011366] N84-31052
Information Center Complex publications and presentations, 1971-1982
[DE84-010603] N84-31055
BIGHORN MOUNTAINS (MT-WY)
Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413
BIMETALS
Analysis of fracture modes during extrusion and drawing of bimetal rods or wire
[DE84-009849] N84-30051
BINARY MIXTURES
Excitation of sound by light N84-30863
BINDING
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
BINOCULAR VISION
PRISM: A practical real-time imaging stereo matcher
[AD-A142532] N84-30686
Nonlinear dynamics of multi-channel binocular vision
[AD-A142600] N84-30689
BIODYNAMICS
A survey of biodynamic test devices and methods
[AD-A142467] N84-29694
BIOGEOCHEMISTRY
Earth Observing System. Volume 1, part 2: Science and mission requirements. Working group report appendix
[NASA-TM-86129] N84-30433
Global biogeochemistry: An overview N84-30435
Biogeochemical considerations N84-30436
Biological oceanography N84-30437
Inland aquatic resources and biogeochemical cycles N84-30438
Earth Observing System, introduction N84-30451
Global Biology Research Program: Biogeochemical Processes in Wetlands
[NASA-CP-2316] N84-30665
Executive summary: Background N84-30666
Geographic distribution of wetland parameters: The foundation of a data base N84-30667
A framework for wetlands research: Development of a wetlands data base N84-30668
BIOLOGICAL EFFECTS
Biological oceanography N84-30437
Land biology N84-30440
Chesapeake Bay nutrient dynamics study
[PB84-190982] N84-30524
Effect of high ammonia content in pressure chamber atmosphere on human adrenocortical system function N84-30658
Laboratory for Energy Related Health Research
[DE84-000529] N84-30672
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678
Effect of constant and low-frequency magnetic fields on biological systems N84-30679
Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 261)
[NASA-SP-7011(261)] N84-30683
BIOLOGY
USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-84-016] N84-30675
BIOMAGNETISM
Biomagnetism: Possible new predictor of personnel performance
[AD-A142451] N84-30697
BIOMASS
Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data N84-30419
Chesapeake Bay nutrient dynamics study
[PB84-190982] N84-30524
Appropriate technology management information system
[DE84-010952] N84-31056
BIOMASS ENERGY PRODUCTION
Photo/Biological Hydrogen Principal Investigators Review Meeting: Proceedings of the May 1983 Program Review
[DE84-000083] N84-30536
BIOPHYSICS
International Workshop on Biophysical Correlates of Cellular Function UNESCO
[AD-A142490] N84-30671
BIOSPHERE
Weather summaries for Coram Experimental Forest, Northwestern Montana: An international biosphere reserve
[PB84-182443] N84-30615
BIPOLARITY
The 8th European Specialist Workshop on Active Microwave Semiconductor Devices 4-6 may 1983
[AD-A142252] N84-30180
BIREFRINGENCE
Crystalline-state extrusion of low density polyethylenes
[AD-A142017] N84-30075
BIREFRINGENT FILTERS
Strategic blue-green communication filters
[AD-A142353] N84-30151
BL LACERTAE OBJECTS
Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081
BLANKETS (FUSION REACTORS)
Liquid metal breeder-coolant blanket concept
[DE84-006554] N84-30871
BLOOD CIRCULATION
USSR report: Space Biology and Aerospace Medicine, vol. 18, no. 3, May - June 1984
[JPRS-USB-84-005] N84-30642
Effect of dihydroergotamine on human circulation during orthostatic tests N84-30646
Circulatory changes in orthostatic position in the presence of hyperthermia N84-30647
Simulation of physiological effects of negative pressure on man N84-30662
BLOOD COAGULATION
Dependence of blood coagulating and fibrinolytic systems on functional state of lysosomal system of neutrophil leukocytes during exposure of the body to low barometric pressure N84-30661
BLOOD PLASMA
Blood plasma free amino acids under hypokinetic conditions N84-30648
BLOOD PRESSURE
Nomogram for demonstrating change in central venous and pulmonary artery pressure during decompression of different parts of the body N84-30660
Increase in whole-body peripheral vascular resistance during three hours of air or oxygen prebreathing
[NASA-TM-58261] N84-30684
BLOOD VESSELS
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
BLOOD VOLUME
Reliability and efficiency of Kubicek rheographic method for monitoring cardiac output and stroke volume N84-30644
BLOWDOWN WIND TUNNELS
Aerodynamic and Propulsion Test Unit (APTU) performance with a vitiated air heater N84-29984
BLOWING
A blowup phenomenon of the working fluid in a two-phase closed thermosyphon N84-30122
BODIES OF REVOLUTION
Invariance of level of rotating liquid
[BLL-M-35611-(5828.4)] N84-30220
BODY TEMPERATURE
Circadian pattern of simian functional parameters during hypokinesia and in the recovery period N84-30650
BOLTS
Eyebolts for lift suspension
[NPL-DMA(A)70] N84-30292
Strains in an elastic plate containing an interference-fit bolt near a free edge
[AR-003-012] N84-30333
BOLTZMANN-VLASOV EQUATION
Analytic solution for the problem of gridded gap-electron flow interaction
[DE84-008975] N84-30209
BOND GRAPHS
Bond graph time simulations using extracted modal parameters from the Nova spaceframe
[DE84-010918] N84-30779
BONDING
Ceramic-glass-metal seal by microwave heating
[DE84-011263] N84-30295

BONE DEMINERALIZATION
Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652
BONE MINERAL CONTENT
Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652
BOOLEAN ALGEBRA
Boolean computation of optimum hitting sets
[DE84-012920] N84-30642
BOOSTER ROCKET ENGINES
LOX/CH4 for reusable high performance booster engines N84-29926
BORON CARBIDES
Liquid metal infiltration of an aluminum alloy into a packed column of B4C particles
[DE84-012136] N84-30055
BOSONS
Weak corrections to the e+e-yields mu+mu-asymmetry
[DO-TH-83-16] N84-30939
BOUNDARY LAYER FLOW
Effect of turbulent boundary layer flow on measurement of acoustic pressure and intensity, revised
[AD-A142473] N84-30229
BOUNDARY LAYER SEPARATION
An integral prediction method for three-dimensional flow separation
[AD-A142551] N84-30231
BOUNDARY LAYER STABILITY
Numerical analysis of the burst in the turbulent boundary layer, based on the three-dimensional ortex model
N84-30116
BOUNDARY LAYERS
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596
Objective analysis and prediction techniques, 1983
[AD-A142441] N84-30599
BOUNDARY VALUE PROBLEMS
Grid-size reduction in flow calculations on infinite domains by higher-order far-field asymptotics in numerical boundary conditions
[NLR-MP-83029-U] N84-30253
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596
On the extremum of bilinear functional for hyperbolic type partial differential equations
[AD-A142505] N84-30826
BOW WAVES
Some contributions to knowledge of the magnetospheric plasma by ISEE investigators
[NASA-TM-86124] N84-30962
BRAIN
Organophosphate toxicity: Genetics, receptors, and antidotes
[AD-A141059] N84-30685
Biomagnetism: Possible new predictor of personnel performance
[AD-A142451] N84-30697
BRAZING
Graphite-ceramic RF Faraday-thermal shield and plasma limiter
[DE84-010960] N84-30086
BREAKING
The breaking of ocean surface waves
[AD-A142356] N84-30629
BREEDER REACTORS
Liquid metal breeder-coolant blanket concept
[DE84-006554] N84-30971
BRIDGES (STRUCTURES)
Research and development of long heat pipes and their applications — heating road surfaces on bridges
N84-30126
BRILLOUIN EFFECT
Study of stimulated Brillouin and Raman scattering
[DE84-011260] N84-30266
BRINES
Environmental assisted fracture of cast and wrought steels in brine
[DE84-011870] N84-30058
BROWNIAN MOVEMENTS
A nonstandard construction of Levy Brownian motion
[REPT-82] N84-30661
BUBBLES
Analysis of airfoil transitional separation bubbles
[NASA-CR-3791] N84-29854
BUCKLING
Postbuckling behavior of graphite-epoxy panels
N84-29976
BUDGETING
A steady-state version of a dynamic optimal budgeting problem
[AD-A142281] N84-31034
BUFFER STORAGE
Elastic buffers for digital rings
[NPL-DITC-36/84] N84-30143
BUMPY TORUSES
Theoretical studies of Elma Bumpy Torus (EBT)
[DE84-010814] N84-30978
BY-PRODUCTS
Negative ion formation in SF6 spark by-products
[DE84-012340] N84-30212

C

CABIN ATMOSPHERES
Cabin air quality
[GPO-29-522] N84-30702
CABLES (ROPES)
Study of latent heat storage system used heat pipes for cooling of underground cables N84-30127
Electromagnetic inspection of wire ropes using sensor arrays
[AD-A142012] N84-30321
CADASTRAL MAPPING
The automated cadastral plan, a source for the topographic country map works N84-30506
CADMIUM
Cadmium plating versus other coatings to prevent corrosion
[AD-A142504] N84-30022
CADMIUM COMPOUNDS
Investigation of the role of sintering in gas-solid interactions
[DE84-010862] N84-30089
HgCdTe surface and defect study program
[AD-A142342] N84-31010
CADMIUM SELENIDES
Spray pyrolysis of cadmium sulfide/copper indium selenide cells
[DE84-004491] N84-30537
CALCIUM
Synthesis of refractory materials
[DE84-011045] N84-30041
Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652
CALCIUM ISOTOPES
Pion elastic and inelastic scattering from (40) (42) (44) (48)Ca and (54)Fe
[DE84-009080] N84-30927
CALCIUM OXIDES
Low temperature sintering of Al2O-CaO
[DE84-010713] N84-30083
CALIBRATING
Mechanical interactions of rough surfaces
[DE84-006589] N84-30311
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1
[E84-10166] N84-30359
Multispectral Scanner (MSS) instrument description
N84-30362
Radiometric calibration and processing procedure for reflective bands on LANDSAT-4 protoflight Thematic Mapper N84-30366
Pre-launch absolute radiometric calibration of LANDSAT-4 protoflight Thematic Mapper N84-30373
Relative radiometric calibration of LANDSAT TM reflective bands — San Francisco, California
N84-30374
Thermal band characterization of LANDSAT-4 Thematic Mapper — Buffalo, New York and water temperature in Lake Erie N84-30376
Revised radiometric calibration technique for LANDSAT-4 Thematic Mapper data by the Canada Centre for Remote Sensing N84-30378
LANDSAT-4 Thematic Mapper calibration and atmospheric correction N84-30384
Calibration of TM data from ground-based measurements N84-30385
MTF analysis of LANDSAT-4 Thematic Mapper
N84-30388
Intraband radiometric performance of the LANDSAT-4 Thematic Mapper N84-30389
Radiometric calibration and geocoded precision processing of LANDSAT-4 Multispectral Scanner products by the Canada Centre for Remote Sensing N84-30404
Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413
Operation and calibration of the Wincharger 450 model SWECS
[DE84-009757] N84-30546
Comparison of lightning flash rates from the PBE sensor and streak counting from the DMSP satellite
[DE84-006722] N84-30602
CALIFORNIA
Snow reflectance from LANDSAT-4 Thematic Mapper
N84-30426
Interannual variability in sea-surface temperature at one location along the central California coast
[AD-A142553] N84-30632
CALORIMETERS
Capillary separations with calorimetric absorbance detection
[DE84-012466] N84-30291
CANALS
Panama Canal Fog Navigation Study: Candidate system definition
[PB84-180793] N84-30624
Panama Canal Fog Navigation Study: System requirements statement
[PB84-179811] N84-30625
CANCELLATION
Nulling in array patterns with orthogonal analytic cancellation beams
[AD-A142719] N84-30188
CANONICAL FORMS
Canonical realizations of completely regular modular computing networks
[AD-A142010] N84-30802
CANOPIES (VEGETATION)
Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data
N84-30419
Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424
CANTILEVER BEAMS
Approximation techniques for parameter estimation and feedback control for distributed models of large flexible structures
[NASA-CR-172411] N84-29903
CAPILLARIES
Capillary separations with calorimetric absorbance detection
[DE84-012466] N84-30291
CAPILLARY FLOW
Thickener/fluid interaction in lubricating greases
[AD-A142276] N84-30076
CAPILLARY TUBES
Diagnostics of a high current capillary discharge
[DE84-011369] N84-30194
CARBON
Salinity and temperature effects on photosynthesis and organic carbon release rates by selected benthic macroalgae
[PB84-163146] N84-30674
Energy-resolving carbon resistance probes for plasma edge characterization
[DE84-012235] N84-30997
CARBON CYCLE
Geographic distribution of wetland parameters: The foundation of a data base N84-30667
CARBON DIOXIDE
CO2 gamma 3 fundamental band 4.5 micrometers laser potential
[AD-A142536] N84-29991
Resonance absorption of narrow-band laser radiation by atmospheric gases N84-30493
Trace constituents measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565
Response to W. W. Kellogg's Carbon Dioxide and Climatic Change
[DE84-010986] N84-30577
Identification and preliminary characterization of global water resource issues which may be affected by CO2-induced climate change
[DE84-011127] N84-30604
CARBON DIOXIDE CONCENTRATION
Trace constituents measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565
Response to W. W. Kellogg's Carbon Dioxide and Climatic Change
[DE84-010986] N84-30577
CARBON DIOXIDE LASERS
CO2 gamma 3 fundamental band 4.5 micrometers laser potential
[AD-A142536] N84-29991
Theoretcial studies of solar-pumped lasers
[NASA-CR-173833] N84-30274
Studies of CO2 laser interactions with plasma
[DE84-012485] N84-31004
CARBON FIBER REINFORCED PLASTICS
Residual curing stress of carbon-resin composites
[ONERA-RT-6/3521-M] N84-2 980
CARBON MONOXIDE
Pulsed-laser atom-probe studies of surface chemical reactions
[DE84-012611] N84-30007

Promotion effects on the synthesis of higher alcohols
[DE84-009916] N84-30109
Sampling report for the study of personal CO (carbon monoxide) exposure
[PB84-181957] N84-30560
Trace constituents measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565

CARBON STEELS
Directional growth of pearlite in Fe-C eutectiod alloys
[DE84-007368] N84-30042

CARBON 13
Ultraviolet light absorbers having 2 different chromophors in the same molecule
[DE84-011279] N84-30000

CARCINOGENS
Use of sperm enzymes to detect genotoxic agents
[AD-A142724] N84-30691

CARDIOGRAPHY
Reliability and efficiency of Kubicek rheographic method for monitoring cardiac output and stroke volume
N84-30644
Walking erect as a factor in development of arterial hypertension in primates N84-30645

CARDIOLOGY
Reliability and efficiency of Kubicek rheographic method for monitoring cardiac output and stroke volume
N84-30644

CARDIOVASCULAR SYSTEM
Reliability and efficiency of Kubicek rheographic method for monitoring cardiac output and stroke volume
N84-30644
Walking erect as a factor in development of arterial hypertension in primates N84-30645
Circadian pattern of simian functional parameters during hypokinesia and in the recovery period N84-30650

CARIBBEAN REGION
Development of alternative energy science and engineering in the Caribbean
[PB84-181106] N84-30552

CARRIER FREQUENCIES
Description of a microwave system for the measurement of close to carrier AM and FM noise spectra
[LEOK-TR-1984-04] N84-30168

CARRIER MOBILITY
Spray pyrolysis of cadmium sulfide/copper indium selenide cells
[DE84-004491] N84-30537
Diffusion and electrical properties of sulfur implanted in gallium arsenide
[AD-A142405] N84-31012

CASCADE FLOW
Aeroelasticity in turbomachine-cascades
[AD-A141905] N84-29880
Two-dimensional and quasi three-dimensional experimental standard configurations for aeroelastic investigations in turbomachine-cascades
[AD-A141904] N84-30297

CAST ALLOYS
Environmental assisted fracture of cast and wrought steels in brine
[DE84-011870] N84-30058

CATALYSTS
Performance verification tests of an uprated augmented catalytic thruster N84-29911
Promotion effects on the synthesis of higher alcohols
[DE84-009916] N84-30109

CATAPULTS
Propulsion in a life-saving role for ACES 2
N84-29942
The Stencel S4S ejection seat: A study in new pyrotechnic developments N84-29943
Crest: Crew escape technologies for the 1990's
N84-29944

CATHODE RAY TUBES
Selection of elements in process schemes on Cathode Ray Tube (CRT). A comparative study between four types of trackballs
[IZF-1984-4] N84-30213

CATHODES
Rigid indented cylindrical cathode for X-ray tube
[DE84-011093] N84-30204

CATIONS
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29981
Cation self-diffusion in Fe2O3
[DE84-009152] N84-31025

CAVITIES
Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy
[DE84-011458] N84-30028
Simulation of powder distribution in IITRI bag experiments
[AD-A141941] N84-30128

CAVITY RESONATORS
Practical aspects of tuning a ringed RFQ
[DE84-011366] N84-30163
General-purpose RFQ design program
[DE84-011327] N84-30165
Analytic solution for the problem of gridded gap-electron flow interaction
[DE84-008975] N84-30209
Excitation of sound by light N84-30863
High-gradient, pulsed operation of superconducting niobium cavities
[DE84-012498] N84-31030

CELLS (BIOLOGY)
International Workshop on Biophysical Correlates of Cellular Function UNESCO
[AD-A142490] N84-30671

CEMENTS
Survey and analysis of materials research and development at selected federal laboratories
[DE84-008904] N84-29967

CENTRIFUGES
Development of hydrocyclones for aluminum/air battery applications
[DE84-011403] N84-30197

CERAMIC BONDING
Joining silicon nitride based ceramics: A technical assessment
[DE84-011356] N84-30092

CERAMIC COATINGS
Sputter-deposited metallic and ceramic coatings for heat engines
[DE84-011401] N84-30030

CERAMICS
Self-propagating high-temperature synthesis of ceramics in vacuum
[AD-A142506] N84-30079
Study of mechano-chemical machining of ceramics and the effect on thin film behavior
[AD-A142542] N84-30080
Ceramics for fusion devices
[DE84-011409] N84-30082
Ceramic to metal attachment system — magnetohydrodynamic generators
[DE84-011095] N84-30085
Graphite-ceramic RF Faraday-thermal shield and plasma limiter
[DE84-010960] N84-30086
High resolution electron microscopy studies of the early stages of decomposition in alloys and ceramics
[DE84-020602] N84-30087
Investigation of the role of sintering in gas-solid interactions
[DE84-010862] N84-30089
Lead zirconate-lead titanate (PZT) ceramics from organic-derived precursors
[DE84-009921] N84-30095
Corrosion resistance of selected ceramic materials to nitric acid
[PB84-178870] N84-30096
Ceramic-glass-metal seal by microwave heating
[DE84-011283] N84-30295
Elastic domain wall waves in ferroelectric ceramics and single crystals
[AD-A142393] N84-31011

CEREBRAL CORTEX
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681

CHAINS
A numerical algorithm for chained aggregation and modified chained aggregation
[AD-A142394] N84-30822

CHANGE DETECTION
Impact of LANDSAT MSS sensor differences on change detection analysis N84-30408

CHANNELS (DATA TRANSMISSION)
Decentralized estimation in communication networks with delay
[AD-A142376] N84-30155
Performance of digital communications over selective fading channels
[AD-A142427] N84-30158

CHARACTER RECOGNITION
Operator performance on flat-panel displays with line and cell failures
[AD-A142340] N84-30716
Report on functional design specification for the automated alphanumeric data entry system
[AD-A142518] N84-30725

CHARGE EFFICIENCY
Secondary alkaline batteries
[DE84-010963] N84-30191
Effect of charging methods on battery electrodes
[DE84-010287] N84-30196
EValuation of a 96V EV 1000 battery pack at temperature extremes
[PB84-187723] N84-30217
Evaluation of an 96V ALCO 2200 battery pack at temperature extremes
[PB84-187731] N84-30219

CHARGED PARTICLES
Traneverse field focused system
[DE84-011070] N84-30942

CHEBYSHEV APPROXIMATION
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596

CHECKOUT
An operating system and memory switch for the S-1 computer
[DE84-013094] N84-30731

CHEMICAL ANALYSIS
Trace analysis in quartz
[AD-A142425] N84-29968
Vapor spill pipe monitor
[DE84-011103] N84-30267

CHEMICAL BONDS
Durability of adhesive bonds with ionic bonds at the interface — propellant binder adhesion N84-29960

CHEMICAL COMPOSITION
Ductile aluminide alloys for high temperature applications
[DE84-011037] N84-30038
Hard metal composition
[DE84-011034] N84-30040

CHEMICAL EFFECTS
Use of sperm enzymes to detect genotoxic agents
[AD-A142724] N84-30691

CHEMICAL ENGINEERING
Engineering scoping study of the production of hydrogen and oxygen from the cerium oxide-sodium phosphate/carbonate thermochemical cycle
[DE84-010629] N84-29998
National Science Foundation, volume 1
[PB84-193234] N84-31061

CHEMICAL EVOLUTION
Chemical evolution of a high-level magma system: The Black Mountain Volcanic Center, Southern Nevada
[DE84-013321] N84-30587

CHEMICAL EXPLOSIONS
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets
N84-29963

CHEMICAL PROPERTIES
Aviation fuels, 1983
[DE84-011823] N84-30106

CHEMICAL REACTIONS
Hydrogen fluoride formation and metal corrosion in freon-contaminated propellants N84-29921
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985
Engineering scoping study of the production of hydrogen and oxygen from the cerium oxide-sodium phosphate/carbonate thermochemical cycle
[DE84-010629] N84-29998
Investigation of laser induced radical reactions using time resolved infrared and coherent anti-Stokes Raman scattering (CARS) spectroscopy
[MPIS-17/1983] N84-30006
Method and apparatus for producing high purity silicon
[DE84-011087] N84-30090
Modeling chemical kinetic aspects of engine knock
[DE84-009674] N84-30312
Using chemically reactive tracers to determine temperature characteristics of geothermal reservoirs
[DE84-011373] N84-30580

CHEMICAL REACTORS
Two-stage process for conversion of synthesis gas to high quality transportation fuels
[DE84-009624] N84-30108
Study of ebullated bed fluid dynamics
[DE84-010230] N84-30251

CHESAPEAKE BAY (US)
Chesapeake Bay nutrient dynamics study
[PB84-190982] N84-30524
Long-term salinity, temperature and current measurements in upper Chesapeake Bay
[PB84-180280] N84-30636

CHINA
US technology transfer to China
[GPO-29-567] N84-31064

CHIPS (ELECTRONICS)
Research in VLSI (Very Large Scale Integration) systems
[AD-A142511] N84-30185

CHLORIDES
Photoelectrochemistry at iron oxide electrodes
[DE84-011453] N84-30003

CHLOROPHYLLS
A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425
CHOLINESTERASE
Organophosphate toxicity: Genetics, receptors, and antidotes
[AD-A141059] N84-30685
CHROMATOGRAPHY
Characterization of organometallic polymers by chromatographic methods and nuclear magnetic resonance, part 2
[PB84-183599] N84-30100
CHROMIUM
Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests
[DE84-012833] N84-30054
CHROMIUM ALLOYS
Improved oxidation sulfidation resistance of Fe-Cr-Ni alloys
[DE84-010086] N84-30039
Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti
[DE84-005411] N84-30043
Creep-fatigue and temperature synergisms in alloy 800
[DE84-010131] N84-30046
Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy
[DE84-012111] N84-30053
CHRONOLOGY
Dependence of crustal structure of eastern Pacific Ocean on its age N84-30483
Structure of ocean floor in relation to conditions for formation of lithosphere N84-30484
CHUTES
Methods for analysis of cracks in three-dimensional solids
[NASA-TM-86266] N84-30330
CIRCADIAN RHYTHMS
Circadian pattern of simian functional parameters during hypokinesia and in the recovery period N84-30650
CIRCUIT BOARDS
The evaluation and approval of automatic machine wave soldering for ESA spacecraft hardware
[ESA-PSS-01-707] N84-30215
CIRCUITS
Europe approaches chaos with electrical circuits
[AD-A142085] N84-30179
Large-signal characterization of nonlinear two-port active networks
[AD-A142462] N84-30184
Lossless symmetric TEM line IMPATT diode power combiners
[AD-A142599] N84-30187
Biasing and fast degaussing circuit for magnetic materials
[DE84-011261] N84-30657
Use of Peltier effect for small signal amplification and conversion N84-30664
CIRRUS CLOUDS
Modification of the surface temperature by an artificial cirrus cloud
[DE84-011387] N84-30611
CITIES
Quick look analysis of TM data of the Washington, District of Columbia area N84-30418
Study of Thematic Mapper and Multispectral Scanner data applications N84-30421
Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory N84-30432
Sunlight probability data for select cities in the US
[DE84-000006] N84-30605
CIVIL AVIATION
The changing airline industry: A status report through 1982
[GAO/RCED-83-179] N84-29858
Decision analysis model for passenger-aircraft fire safety with application to fire-blocking of seats
[AD-A142477] N84-29859
FAA (Federal Aviation Administration) air traffic activity FY 1983
[AD-A142493] N84-29861
Report of accomplishments under the airport improvement program
[AD-A142444] N84-29889
CLADDING
Space nuclear safety program
[DE84-011015] N84-30943
CLASSIFICATIONS
Impact of Thematic Mapper sensor characteristics on classification accuracy N84-30410
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416
Study of Thematic Mapper and Multispectral Scanner data applications N84-30421
The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30428
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429
Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory N84-30432
CLASSIFYING
The complexity of sorting on distributed systems
[AD-A142415] N84-30825
CLEANING
Purification of nitrogen tetroxide for long-term reliability N84-29820
CLIMATE
Oceanic transport N84-30444
Tropospheric science N84-30447
Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada
[DE84-009032] N84-30610
CLIMATOLOGY
Inevitable climatic changes N84-30480
Effect of antiscreening of outgoing thermal radiation by cloud cover N84-30490
Climatological Summary Programs F6 and CLIMAT
[PB84-185941] N84-30603
Identification and preliminary characterization of global water resource issues which may be affected by CO2-induced climate change
[DE84-011127] N84-30604
Weather summaries for Coram Experimental Forest, Northwestern Montana: An international biosphere reserve
[PB84-182443] N84-30615
US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141810] N84-30627
CLOUD COVER
Stability criterion for moist compressible atmosphere and energy conditions for development of convective cloud cover: Numerical experiment N84-30489
Effect of antiscreening of outgoing thermal radiation by cloud cover N84-30490
Accuracy of one approximate method for computing radiative fluxes in presence of broken clouds N84-30491
CLOUD PHYSICS
Theoretical and measured airflow about the Twin Otter wing
[AD-A141974] N84-29855
Analysis of some cloud and frontal events recorded during the Boulder Upslope Cloud Observation Experiment (BUCOE) of 1982
[PB84-179662] N84-30622
CLOUD SEEDING
Modification of the surface temperature by an artificial cirrus cloud
[DE84-011387] N84-30611
CLOUDS
Electro-optical transmission and liquid water content of fogs and clouds
[AD-A142294] N84-30597
CLOUDS (METEOROLOGY)
Comparison of icing cloud instruments for 1982-1983 icing season flight program
[NASA-TM-83569] N84-29870
Analysis of some cloud and frontal events recorded during the Boulder Upslope Cloud Observation Experiment (BUCOE) of 1982
[PB84-179662] N84-30622
CLUSTER ANALYSIS
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
COAL LIQUEFACTION
Study of ebullated bed fluid dynamics
[DE84-010230] N84-30251
COASTS
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512
Interannual variability in sea-surface temperature at one location along the central California coast
[AD-A142553] N84-30632
COBOL
Burroughs Corporation, B5900, large systems COBOL74 3.4.1.
[PB84-181379] N84-30735
Gould Incorporated, Gould Concept 32/87, COBOL Release 1.4
[PB84-180249] N84-30796
Common data input-retrieval system
[DE84-010972] N84-31053
CODERS
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
CODING
PURDU-WINCOF: A computer code for establishing the performance of a fan-compressor unit with water ingestion
[NASA-CR-168005] N84-29875
Three image compression algorithms for Compression and Decompression of Imaging Sensor Signals (CADISS)
[NLR-MP-83027-U] N84-30791
COEFFICIENT OF FRICTION
Friction in low speed lubricated rolling and sliding contacts
[VTT-16] N84-30318
COGNITION
Speculations on the future of test design
[AD-A142662] N84-30690
Interaction of human cognitive models and computer-based models in supervisory control
[AD-A142677] N84-30717
COHERENT RADIATION
New adaptive processor for coherent signals and interference
[AD-A142636] N84-30776
COLD PLASMAS
Space resolved absolutely calibrated VUV spectroscopic measurements on CTX
[DE84-007490] N84-30984
COLD WORKING
Effects of variations in coldworking repair procedures on flaw growth and structural life
[AD-A141966] N84-30336
COLLISION RATES
Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994
COLLISIONLESS PLASMAS
Electron velocity distributions near collisionless shocks
[DE84-011352] N84-30235
Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30960
COLLISIONS
Kinetic processes in high pressure gases. Excited state collisions
[AD-A141927] N84-30016
Cosmic bombardment
[DE84-011402] N84-31071
COLLOCATION
Results of laser ranging collocations during 1983 N84-30458
COLOR
CHART and SKETCH: An interactive computer graphics program
[AD-A141997] N84-30744
COLOR CODING
An investigation of the reproduction of the general topographic map 1:200,000 in shortened scale with a digital raster data processing system N84-30505
COLOR TELEVISION
The present status of Clean PAL systems
[BBC-RD-1984/6] N84-30142
COLOR VISION
Nonlinear dynamics of multi-channel binocular vision
[AD-A142600] N84-30689
COLORADO PLATEAU (US)
Seismicity of the Paradox Basin and the Colorado Plateau interior
[DE84-011620] N84-30516
COLUMNS (PROCESS ENGINEERING)
Two-stage process for conversion of synthesis gas to high quality transportation fuels
[DE84-009624] N84-30108
COLUMNS (SUPPORTS)
Formulation of stiffness matrices for elastic buckling of thin-walled open section prismatic columns
[TT-8402] N84-30353
COMBINATORIAL ANALYSIS
Applications of combinatorics to the busy period in several queueing models
[AD-A142492] N84-30850
COMBUSTION
High pressure LOX/natural gas staged combustion technology N84-29927
Experimental facilities to study hydrogen combustion and detonation
[DE84-008998] N84-29997
Vortex methods and turbulent combustion
[DE84-011874] N84-30004
Modeling chemical kinetic aspects of engine knock
[DE84-009674] N84-30312

COMBUSTION CHAMBERS
Atomization of liquid sheets in high pressure airflow
[NASA-TM-83731] N84-30223

COMBUSTION CONTROL
Integral low-energy thermite igniter
[DE84-011062] N84-29999

COMBUSTION EFFICIENCY
Recent applications of the CONTAM 3 computer model to spacecraft propulsion systems N84-29916
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets
N84-29963

COMBUSTION PRODUCTS
Combustion of GAP, part 1 N84-29952

COMETS
Cosmic bombardment
[DE84-011402] N84-31071

COMMAND AND CONTROL
Graphics language, version 2.2
[AD-A142436] N84-30772
Hierarchial command, control and coupled bilinear systems
[AD-A142401] N84-30823

COMMERCE
Ada (trademark) for business and other non-DOD applications
[AD-P003425] N84-30757

COMMERCIAL AIRCRAFT
Decision analysis model for passenger-aircraft fire safety with application to fire-blocking of seats
[AD-A142477] N84-29859
Fuel savings potential of the NASA Advanced Turboprop Program
[NASA-TM-83736] N84-29878

COMMUNICATION
Acoustical communications by means of small explosive charges
[DE84-008903] N84-30161

COMMUNICATION EQUIPMENT
Performance of digital communications over selective fading channels
[AD-A142427] N84-30158
Communication aids for the handicapped N84-30715
Computer graphics enhancement for COMEL (communications electronics)
[AD-A141920] N84-30741

COMMUNICATION NETWORKS
Study of the FAA (Federal Aviation Administration) program to modernize maintenance operations
[AD-A142295] N84-29848
Elastic buffers for digital rings
[NPL-DITC-38/84] N84-30143
Decentralized estimation in communication networks with delay
[AD-A142376] N84-30155
Performance measurement in a distributed processing environment
[AD-A142410] N84-30722
A minimum area VLSI (Very Large Scale Integrated) architecture for O(logn) time sorting
[AD-A142414] N84-30723

COMMUNICATION SATELLITES
Spectrum/orbit utilization program for geostationary satellites
[NASA-TM-83759] N84-30146

COMPACTING
Dynamic powder compaction
[DE84-006133] N84-30132

COMPARISON
Comparison of methods for calculating energy release rates
[DE84-012231] N84-30350
Comparison of lightning flash rates from the PBE sensor and streak counting from the DMSP satellite
[DE84-006722] N84-30602

COMPATIBILITY
The compatibility of MON-3 and 301 cryoformed stainless steel N84-29924

COMPILERS
Software research for computer aided cartography at the Berlin Technical University N84-30503
Modular Computer System, Inc. Modular NASA extended FORTRAN 78 C.1
[PB84-180231] N84-30734
Burroughs Corporation, B5900, large systems COBOL74 3.4.1.
[PB84-181379] N84-30735
Learning the Ada (trademark) integrated environment
[AD-P003417] N84-30749
DCP (Distributed software engineering control process): Experience in bootstrapping an Ada (trademark) environment
[AD-P003424] N84-30756
Burroughs Corporation B1000 system interactive, BASIC release 11.0
[PB84-180215] N84-30794
Data General Corporation ECLIPSE MV/8000, MP-BASIC revision 3.00
[PB84-181361] N84-30796
United Information Services, Inc. CDC Cyber 175, super BASIC version 1.0
[PB84-181387] N84-30797
Gould incorporated, Gould Concept 32/87, COBOL Release 1.4
[PB84-180249] N84-30798

COMPONENT RELIABILITY
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423

COMPOSITE MATERIALS
Interfacial interaction and adhesion in composite materials N84-29961
ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures
[NASA-CP-2321] N84-29969
Worldwide flight and ground-based exposure of composite materials N84-29971
Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972
Impact dynamics research on composite transport structures N84-29975
Studies of noise transmission in advanced composite material structures N84-29977
Electropositive bivalent metallic ion unsaturated polyester complexed polymer concrete
[DE84-011080] N84-29979
Characterization of the microstructures of various materials
[AD-A141948] N84-30017
Adhesive bond and composite strength screening system developmental study
[FZM-7184] N84-30073

COMPOSITE STRUCTURES
Fatigue and Fracture Branch: A compendium of recently completed and on-going research projects
[NASA-TM-85825] N84-30331

COMPRESSED AIR
Compressed air systems: A guidebook on energy and cost savings
[DE84-006802] N84-30133

COMPRESSIBLE FLOW
Acoustic pressures emanating from a turbomachine stage
[NASA-TM-83734] N84-30224
Spectral methods for compressible flow problems
[NASA-CR-172395] N84-30816
Semi-implicit method for three-dimensional compressible MHD simulation
[IPP-6/234] N84-30961

COMPRESSION LOADS
Postbuckling behavior of graphite-epoxy panels
N84-29976
New experimental techniques with the split Hopkinson pressure bar
[DE84-003818] N84-30268
Development of a high-pressure quasi-isentropic plane wave generating capability
[DE84-011619] N84-30348

COMPRESSIVE STRENGTH
Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972
Synthesis and toughness properties of resins and composites N84-29973

COMPRESSORS
Research and development of energy-efficient high back-pressure compressor
[DE84-011827] N84-30131
Advanced electric heat pump dual-stroke compressor and system development
[DE84-007916] N84-30239
Solid state compressor
[AD-A142605] N84-30300
A data acquisition and real-time display system for testing a jet engine compressor
[AD-A142696] N84-30301

COMPUTATION
Transport properties of concentrated solutions
[DE84-008495] N84-30210
Application of molecular dynamics to macroscopic particles
[DE84-011066] N84-30244
Comparison of methods for calculating energy release rates
[DE84-012231] N84-30350
Computational method for thermoviscoelasticity with application to rock mechanics
[DE84-003087] N84-30565
Proton-induced single event upsets in 71 Earth-satellite environments
[AD-A142435] N84-30771
Design issues in parallel architectures for artificial intelligence
[AD-A142482] N84-30809
Smoothed local symmetries and their implementation
[AD-A142489] N84-30811
On the design of a Pipelined/Systolic finite element system
[AD-A142558] N84-30830
Boolean computation of optimum hitting sets
[DE84-012920] N84-30842

COMPUTATIONAL FLUID DYNAMICS
Random-choice solutions for two-dimensional and axisymmetric supersonic flows N84-30115
Elliptic grid generation for three-dimensional geometries N84-30117
Numerical simulation of autorotation N84-30118
Freejets of rotationally relaxing diatomic gases
N84-30119
Viscous computation of a space shuttle flow field
[NASA-TM-85977] N84-30225
Generalized roughness effects on turbulent boundary layer heat transfer. A discrete element predictive approach for turbulent flow over rough surfaces
[AD-A141943] N84-30227
Progress in the development of an intermittency model of turbulence
[CFD/83/7] N84-30255
Review of NASA's (National Aeronautics and Space Administration) Numerical Aerodynamic Simulation Program
[NASA-CR-173842] N84-30799

COMPUTATIONAL GRIDS
Elliptic grid generation for three-dimensional geometries N84-30117
Grid-size reduction in flow calculations on infinite domains by higher-order far-field asymptotics in numerical boundary conditions
[NLR-MP-83029-U] N84-30253
GAME: An interactive graphic system for automatic mesh generation
[CISE-2211] N84-30790

COMPUTER AIDED DESIGN
Modeling and extraction of interconnect parameters in very-large-scale integrated circuits
[AD-A142381] N84-30182
Graphics workstation switching unit
[DE84-011626] N84-30788
Linear systems analysis program: Programmer's manual, version 2.2 (VAX/VMS)
[DE84-010953] N84-30836
The application of a general purpose data base management system to design automation
[AD-A141999] N84-31046

COMPUTER AIDED MANUFACTURING
Precision flexible machining cells within a manufacturing system
[AD-A142527] N84-30129
Integrated Computer-Aided Manufacturing (ICAM) architecture, part 3. Volume 5: Composite function model of manufacture product (MFG0)
[AD-A142337] N84-30766
Integrated Computer-Aided Manufacturing (ICAM) architecture. Part 3, volume 4: Composite information model of design product (DES 1)
[AD-A142447] N84-30774

COMPUTER AIDED MAPPING
Reports on cartography and geodesy. Series 1: Original reports, number 92
[ISSN-0469-4236] N84-30495
Automation assisted gathering, processing, and representation of topographic data for the production of the German basic map 1:5000 - height in Lower Saxony
N84-30500
Forest generalization by digital raster data processing
N84-30501
Software research for computer aided cartography at the Berlin Technical University N84-30503
An example of computer aided generalization of TK 25 — topographical map 1:25,000 (TK 25) N84-30504
An investigation of the reproduction of the general topographic map 1:200,000 in shortened scale with a digital raster data processing system N84-30505
A system for automatic digitization of cartographic line drawings N84-30506
Raster processing for regional planning tasks
N84-30507
The automated cadastral plan, a source for the topographic country map works N84-30508
Suggestion for a cartographic pattern recognition system using digital raster data processing methods
N84-30509
Data integrity factors affecting the construction of the mapping, charting, and geodesy data base
[NASA-CR-173835] N84-30511

COMPUTER ASSISTED INSTRUCTION

Teaching Ada (trademark) at the US Military Academy [AD-P003418] N84-30750

Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers exercise guide [AD-A142429] N84-30767

Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers' guide: Volume 1 [AD-A142430] N84-30768

Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers guide: Volume 2 [AD-A142431] N84-30769

COMPUTER COMPATIBLE TAPES

TM digital image products for applications N84-30371

COMPUTER DESIGN

On the design of a Pipelined/Systolic finite element system [AD-A142558] N84-30830

COMPUTER GRAPHICS

Interactive computer analysis methods for predicting the inelastic cyclic behaviour of structural sections [PB84-192012] N84-30358

DIGMAP, an interactive graphic support system for mine survey N84-30496

COMEDG: A program to combine logically independent line segments into geometrically coherent lines N84-30499

An assessment of interactive graphics processing in short-range terminal weather forecasting [AD-A142706] N84-30601

Computer graphics enhancement for COMEL (communications electronics) [AD-A141920] N84-30741

CHART and SKETCH: An interactive computer graphics program [AD-A141997] N84-30744

Experience with Ada (trademark) for the Graphical Kernel System [AD-P003426] N84-30758

Graphics language, version 2.2 [AD-A142436] N84-30772

Guide to graphics at ANL, revised [DE84-013189] N84-30786

Graphics workstation switching unit [DE84-011626] N84-30788

GAME: An interactive graphic system for automatic mesh generation [CISE-2211] N84-30790

Report on the experience with the Supervisory Control and Diagnostics System (SCDS) of MFTF-B [DE84-012599] N84-30807

Smoothed local symmetries and their implementation [AD-A142469] N84-30811

GRAPH 2: A digitizing and graph plotting program [DE84-010747] N84-30834

COMPUTER INFORMATION SECURITY

Guideline for computer security certification and accreditation. Category: ADP (Automatic Data Processing) operations. Subcategory: Computer security. Federal information processing standards [FIPS-PUB-102] N84-30736

Guidelines for contingency planning NASA (National Aeronautics and Space Administration) ADP security risk reduction decision studies [PB84-189836] N84-30737

COMPUTER NETWORKS

Graphics workstation switching unit [DE84-011626] N84-30788

Augmenting computer networks [NASA-CR-172399] N84-30800

Canonical realizations of completely regular modular computing networks [AD-A142010] N84-30802

Argonne integrated heterogeneous file transfer network [DE84-012092] N84-30803

Syntax and semantics of a LINCS control monologue [DE84-011399] N84-30805

Serial link protocol design: A critique of the X.25 standard, level 2 [DE84-002724] N84-30806

COMPUTER PROGRAM INTEGRITY

Guideline for computer security certification and accreditation. Category: ADP (Automatic Data Processing) operations. Subcategory: Computer security. Federal information processing standards [FIPS-PUB-102] N84-30736

COMPUTER PROGRAMMING

Performance measurement in a distributed processing environment [AD-A142410] N84-30722

Supercomputers: The next ten years. A user's view [DE84-011072] N84-30727

A user-oriented laboratory data entry computer system designed to reduce errors [DE84-011901] N84-30730

The S-1 Mark IIA supercomputer [DE84-012374] N84-30732

Proceedings of the 2nd Annual Conference on Ada (Trademark) Technology [AD-A142403] N84-30745

Teaching Ada (trademark) at the US Military Academy [AD-P003418] N84-30750

Experiences in teaching Ada (trademark) [AD-P003419] N84-30751

Teaching Ada (trademark) at Hampton Institute [AD-P003420] N84-30752

The CECOM summer faculty research program [AD-P003421] N84-30753

Teach Ada (trademark) as the student's first programming language? [AD-P003422] N84-30754

An advanced host-target environment for the military computer family [AD-P003428] N84-30760

Ada (trademark) as a program design language: Have the major issues been addressed and answered? [AD-P003430] N84-30762

Ada (trademark) design language concerns [AD-P003431] N84-30763

Seeding the Ada (trademark) software components industry [AD-P003432] N84-30764

Guide to graphics at ANL, revised [DE84-013189] N84-30786

FORTRAN 8x: The scientific programming language of the future [DE84-012526] N84-30787

Guidelines for the design of large modular scientific libraries in Ada [CWI-NM-N8401] N84-30792

COMPUTER PROGRAMS

PURDU-WINCOF: A computer code for establishing the performance of a fan-compressor unit with water ingestion [NASA-CR-168005] N84-29875

Recent applications of the CONTAM 3 computer model to spacecraft propulsion systems N84-29916

Spectrum/orbit utilization program for geostationary satellites [NASA-TM-83759] N84-30146

General-purpose RFQ design program [DE84-011327] N84-30165

INFIL1D: A quasi-analytical model for simulating one-dimensional, constant flux infiltration [DE84-006905] N84-30250

A data acquisition and real-time display system for testing a jet engine compressor [AD-A142696] N84-30301

Geodyn systems development N84-30467

The ERODYN and QRPIG computer programs N84-30468

Software research for computer aided cartography at the Berlin Technical University N84-30503

MULAP4: A multi-linear analysis program for ground motion studies of horizontally layered systems [PB84-182815] N84-30591

Climatological Summary Programs F6 and CLIMAT [PB84-165941] N84-30603

Zones [PB84-174325] N84-30616

Automated analysis of upper air soundings to specify precipitation type [PB84-174333] N84-30617

Documentation of wave-height and tidal analysis programs for automated data acquisition and control systems [AD-A142679] N84-30634

Guidelines for running the thermal computational model of the eye [AD-A142550] N84-30688

A user-oriented laboratory data entry computer system designed to reduce errors [DE84-011901] N84-30730

Verification of asynchronous transmissions [PB84-189885] N84-30738

Computer science and technology: Introduction to software packages [NBS-SP-500-114] N84-30740

Improvements to software maintenance methods in real time embedded aviation flight systems [AD-A141949] N84-30742

Configuration management with the Ada (trademark) language [AD-P003416] N84-30748

Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers exercise guide [AD-A142429] N84-30767

Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers' guide: Volume 1 [AD-A142430] N84-30768

Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers guide: Volume 2 [AD-A142431] N84-30769

Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers guide [AD-A142432] N84-30770

Proton-induced single event upsets in 71 Earth-satellite environments [AD-A142435] N84-30771

Modifications to iterative recursion unfolding algorithms and computer codes to find more appropriate neutron spectra [AD-A142475] N84-30775

Quality Assurance (QA) procedures for computer software in department 1510 [DE84-012131] N84-30778

SLR-PLUS version 1.0 reference manual [DE84-009180] N84-30781

SLATEC mathematical subprogram library, version 2.0 [DE84-010750] N84-30782

WC user's guide [DE84-009242] N84-30784

Software quality assurance programs: Key elements of concern in selected commercial approaches [DE84-009486] N84-30785

Guide to graphics at ANL, revised [DE84-013189] N84-30786

Current research in parallel microprocessing systems at Los Alamos [DE84-011342] N84-30804

Intelligent optical design program [DE84-010071] N84-30813

Automated planning for intelligent machines in energy-related applications [DE84-011666] N84-30815

GRAPH 2: A digitizing and graph plotting program [DE84-010747] N84-30834

Linear systems analysis program: Programmer's manual, version 2.2 (VAX/VMS) [DE84-010953] N84-30835

Measurement techniques for high-power semiconductor materials and devices [DE84-010425] N84-31016

A system for policy analysis in manpower planning. Part 2: Design of the dialogue component [AD-B082961] N84-31043

COMPUTER STORAGE DEVICES

CHART and SKETCH: An interactive computer graphics program [AD-A141997] N84-30744

COMPUTER SYSTEMS DESIGN

Supercomputers: The next ten years. A user's view [DE84-011072] N84-30727

Logic machine architecture inference mechanisms: Layer 2 user reference manual release 2.0 [DE84-012115] N84-30728

Augmenting computer networks [NASA-CR-172399] N84-30800

DBMS conversion case study [DE84-011205] N84-31054

COMPUTER SYSTEMS PERFORMANCE

Supercomputers: The next ten years. A user's view [DE84-011072] N84-30727

DBMS conversion case study [DE84-011205] N84-31054

COMPUTER SYSTEMS PROGRAMS

Definition and layout of a traffic generator for an air traffic control simulation [DFVLR-FB-84-15] N84-29862

Software research for computer aided cartography at the Berlin Technical University N84-30503

The DFVLR contrast transmittance model SCOTRAN-program system: Description and operating instruction [DFVLR-FB-84-18] N84-30589

Preliminary result of our new Nationwide Evaluation of X-ray Trends (NEXT) program for Italy [ISS-L-84/3] N84-30693

FORTRAN 8x: The scientific programming language of the future [DE84-012526] N84-30787

GAME: An interactive graphic system for automatic mesh generation [CISE-2211] N84-30790

A system for policy analysis in manpower planning. Part 2: Design of the dialogue component
[AD-B082961] N84-31043

COMPUTER TECHNIQUES
Design of a safety monitor system for high explosives machining
[DE84-010101] N84-30113
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157
TOPAZ: A finite element heat conduction code for analyzing 2-D solids
[DE84-010676] N84-30247
Nova laser alignment control system
[DE84-010992] N84-30288
Analysis of computer interactive tests for assigning helicopter pilots to different missions
[AD-A142434] N84-30696
Review of the Third Biennial Conference on Real-Time Computer Applications in Nuclear and Particle Physics
[DE84-002457] N84-30720
Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense
[AD-A141982] N84-30721
Performance measurement in a distributed processing environment
[AD-A142410] N84-30722
A user-oriented laboratory data entry computer system designed to reduce errors
[DE84-011901] N84-30730
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers guide: Volume 2
[AD-A142431] N84-30769
FORTRAN 8x: The scientific programming language of the future
[DE84-012526] N84-30787
Smoothed local symmetries and their implementation
[AD-A142489] N84-30811
A numerical algorithm for chained aggregation and modified chained aggregation
[AD-A142394] N84-30822

COMPUTER VISION
PRISM: A practical real-time imaging stereo matcher
[AD-A142532] N84-30686
Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense
[AD-A141982] N84-30721

COMPUTERIZED SIMULATION
Air Force Academy Aeronautics Digest
[AD-A142399] N84-29849
Interference drag in a simulated wing-fuselage juncture
[NASA-CR-3811] N84-29853
Definition and layout of a traffic generator for an air traffic control simulation
[DFVLR-FB-84-15] N84-29862
Improved pilot model for application to a computer flight testing program for helicopters
[NLR-MP-83052-U] N84-29869
Heat transfer and oil flow studies on a single-stage-to-orbit control-configured winged entry vehicle
[NASA-TM-85833] N84-29897
A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems
[AD-A141136] N84-29898
Recent applications of the CONTAM 3 computer model to spacecraft propulsion systems N84-29916
Simulation of powder distribution in IITRI bag experiments
[AD-A141941] N84-30128
Dynamic powder compaction
[DE84-006133] N84-30132
A computer model for a multiple high PRF pulse Doppler radar
[AD-A142357] N84-30152
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157
Computer-generated movie on the short pulse electromagnetic behavior of wire objects
[DE84-012032] N84-30162
Evaluation of the attenuation length of a scintillator by means of a computer simulation of the light collection efficiency in long scintillation counters
[NOTA-INTERNA-820] N84-30169
INFIL1D: A quasi-analytical model for simulating one-dimensional, constant flux infiltration
[DE84-006905] N84-30250
Computer simulation of the Lasertron
[DE84-012242] N84-30287
Investigation of laminar shocks
[DE84-010074] N84-30582
Analysis of computer interactive tests for assigning helicopter pilots to different missions
[AD-A142434] N84-30696
Bond graph time simulations using extracted model parameters from the Nova spaceframe
[DE84-010916] N84-30779
WC user's guide
[DE84-009242] N84-30784
Intelligent optical design program
[DE84-010071] N84-30813
A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912
Monte Carlo simulation of the microcanonical ensemble
[DE84-010680] N84-30923
Optical support Hartmann sensor optical simulation
[AD-A142525] N84-30955
Realistic modelling of lower hybrid current drive with multiple codes
[DE84-010576] N84-30982
Computer simulation studies of sputtering and multimer formation from clean and oxygen reacted surfaces of titanium, vanadium and niobium
[AD-A141998] N84-31009

COMPUTERS
Review of the Third Biennial Conference on Real-Time Computer Applications in Nuclear and Particle Physics
[DE84-002457] N84-30720
Characterization of real-time computers
[NASA-CR-3807] N84-30601

CONCENTRATION (COMPOSITION)
Definition of the concentration gradient above flammable liquids
[DE84-008296] N84-29996
Measurements of dissolved gases at Corps of Engineers projects
[AD-A142727] N84-30130
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86285] N84-30566

CONCENTRATORS
Photovoltaic concentrators: Present status and future role
[DE84-005520] N84-30532

CONCRETE STRUCTURES
Tensile crack exposure tests. Statistical analysis of the long-term durability of series B beams
[AD-A141955] N84-30335
Effects of bond deterioration on hysteretic behavior of reinforced concrete joints
[PB84-192020] N84-30343
Local bond stress-slip relationships of deformed bars under generalized excitations: Experimental results and analytical model
[PB84-192848] N84-30355
Interactive computer analysis methods for predicting the inelastic cyclic behaviour of structural sections
[PB84-192012] N84-30358

CONDITIONED REFLEXES
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677

CONDUCTIVE HEAT TRANSFER
The heat pipe exchanger with controllable heat exchanging area N84-30124
A convective mechanism for inhibition of heat conduction in laser produced plasmas
[DE84-011336] N84-30289

CONES
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157

CONFERENCES
The 1984 JANNAF Propulsion Meeting, volume 1
[AD-A142852] N84-29906
The 1984 JANNAF Propulsion Meeting, volume 2
[AD-A143025] N84-29939
ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures
[NASA-CP-2321] N84-29969
Electrochemistry Research Needs for Mineral and Primary Materials Processing: Report of Workshop
[PB84-192905] N84-30062
Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-2] N84-30114
Geodynamics
[NASA-CP-2325] N84-30475
Debris Flows, Landslides, and Floods in the San Francisco Bay Region, January 1982: Overview and summary of a conference
[PB84-194737] N84-30590
Proceedings of Tsunami Symposium
[PB84-183482] N84-30636
International Workshop on Biophysical Correlates of Cellular Function UNESCO
[AD-A142490] N84-30671
Third World Congress on Emergency and Disaster Medicine
[FOA-C-52005-H4] N84-30692
Proceedings of the 2nd Annual Conference on Ada (Trademark) Technology
[AD-A142403] N84-30745
IEEE Transactions on Nuclear Science. Volume NS-30, no. 4, part 2: 1983 Particle Accelerator Conference
[DE84-007400] N84-30914

CONFIGURATION INTERACTION
Determination of energetics and spectra of simple molecular systems using theoretical methods
[DE84-009666] N84-30930

CONFIGURATION MANAGEMENT
Configuration management with the Ada (trademark) language
[AD-P003416] N84-30748

CONFORMAL MAPPING
A variational formulation for dissipative maps
[REPT-81] N84-30846

CONGRESSIONAL REPORTS
Report of accomplishments under the airport improvement program
[AD-A142444] N84-29889
Cabin air quality
[GPO-29-522] N84-30702
Land Remote-Sensing Commercialization Act of 1984
[H-REPT-98-647] N84-31063
US technology transfer to China
[GPO-29-567] N84-31064

CONSECUTIVE EVENTS
Human reliability analysis using event trees
[S/T-REPT-VOL-1-NO-3] N84-30716

CONSOLIDATION
Mechanical properties of a shock consolidated steel powder
[DE84-003573] N84-30056

CONSTANTS
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983
The reliability of standard rate constants for rapid electrochemical reactions
[AD-A142445] N84-29989
Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994

CONSTRAINTS
Testament of general boundary conditions and point-wise state variable constraints in optimum design for static and dynamic response
[PB84-192749] N84-30356
Bias removal for conventional magnetotelluric data
[DE84-012189] N84-30579

CONTAMINANTS
Purification of nitrogen tetroxide for long-term reliability N84-29920
Effect of living conditions in confined space on formation of bacterial aerosol N84-30659

CONTINENTAL SHELVES
Continental shelf processes affecting the oceanography of the South Atlantic Bight
[DE84-010113] N84-30635
Proceedings of Tsunami Symposium
[PB84-183482] N84-30636
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 1: Executive summary
[PB84-187939] N84-30639
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 2: Mid-Atlantic region
[PB84-187947] N84-30640
Environmental geologic studies on the United States mid-and north Atlantic outer continential shelf area, 1980-1982. Volume 3: North Atlantic region
[PB84-187954] N84-30641

CONTINGENCY
Guidelines for contingency planning NASA (National Aeronautics and Space Administration) ADP security risk reduction decision studies
[PB84-189836] N84-30737

CONTINUITY EQUATION
Some computational aspects of the stability analysis of nonlinear structures
[NLR-MP-82034-U] N84-30351

CONTINUUM MECHANICS
Nonlocal continuum theory for dislocation and fracture
[AD-A142536] N84-30340
Some computational aspects of the stability analysis of nonlinear structures
[NLR-MP-82034-U] N84-30351
CONTOURS
The curvature primal sketch
[AD-A142460] N84-30627
CONTROL
Engineering physiology: New area for use of control theory N84-30676
Linear systems analysis program: Programmer's manual, version 2.2 (VAX/VMS)
[DE84-010953] N84-30835
CONTROL CONFIGURED VEHICLES
Heat transfer and oil flow studies on a single-stage-to-orbit control-configured winged entry vehicle
[NASA-TM-85833] N84-29697
CONTROL EQUIPMENT
Selection of elements in process schemes on Cathode Ray Tube (CRT). A comparative study between four types of trackballs
[IZF-1984-4] N84-30213
Strategies for analytical applications and implementation of a multi-purpose laboratory robot
[DE84-012379] N84-30314
CONTROL SIMULATION
OMV: A simplified mathematical model of the orbital maneuvering vehicle
[NASA-CR-171123] N84-29902
CONTROL STABILITY
Inductively stabilized excimer lasers
[DE84-011371] N84-30284
CONTROL THEORY
Engineering physiology: New area for use of control theory N84-30676
The Man-Machine Systems Group N84-30704
Supervisory control: Introduction and theory — industrial plant control N84-30706
Modeling the human operator's supervising behavior — industrial plants N84-30707
Control theory of partial differential equations
[AD-A142636] N84-30812
Linear structures in bilinear systems
[RR-250] N84-30852
CONTROLLABILITY
Simulator evaluation of a remotely piloted vehicle lateral landing task using a visual display
[NASA-TM-85903] N84-29665
CONTROLLED SYSTEMS DESIGN
Report on the experience with the Supervisory Control and Diagnostics System (SCDS) of MFTF-B
[DE84-012599] N84-30807
Design philosophy for reliable systems, including control
[DE84-012661] N84-30814
CONTROLLERS
Energy management for crew escape systems
N84-29945
Control systems design for linear dynamic systems using simple models: Some case studies. Part 1: The single-input/single-output case
[RR-247-PT-1] N84-30134
DCP (Distributed software engineering control process): Experience in bootstrapping an Ada (trademark) environment
[AD-P003424] N84-30756
Characterization of real-time computers
[NASA-CR-3807] N84-30801
Some design guidelines and discrete-time adaptive controllers
[NASA-CR-173800] N84-30806
Commissioning tests of the Bonneville Power Administration 30 MJ superconducting magnetic energy storage unit
[DE84-006033] N84-30860
CONVECTION
Variability of the convection field pattern in South Florida and its relationship to the synoptic flow
[PB84-177393] N84-30623
CONVECTION CLOUDS
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596
CONVECTIVE FLOW
Natural convection flows and associated heat transfer processes in room fires
[PB84-171172] N84-30140
Stability criterion for moist compressible atmosphere and energy conditions for development of convective cloud cover: Numerical experiment N84-30489
CONVECTIVE HEAT TRANSFER
Natural convection flows and associated heat transfer processes in room fires
[PB84-171172] N84-30140
CONVERGENCE
Non-inertial flow of dilute polymer solutions in a sudden contraction
[BLL-WH-558-(909A.9F)] N84-30221
Testament of general boundary conditions and point-wise state variable constraints in optimum design for static and dynamic response
[PB84-192749] N84-30356
COOLING
Requirements for high-temperature air-cooled central receivers
[DE84-000081] N84-30534
High-Q open resonator structures with sparse spectrum N84-30876
COOLING SYSTEMS
Study of latent heat storage system used heat pipes for cooling of underground cables N84-30127
Open cycle lithium chloride cooling system
[DE84-005831] N84-30234
Resonance in the water circuit of a cooling tower
[S/T-REPT-VOL-1-NO-2] N84-30254
COORDINATES
A Taylor series in symmetry-adaptable functions
[AD-A142336] N84-30819
Spinorial relativistic rotator: The transformation from quasi-Newtonian to Minokowski coordinates
[DE84-009081] N84-30839
Moving finite elements in 2-D. Technical report: Year 3
[DE84-008551] N84-30840
COPOLYMERS
Characterization of block copolymers based on poly(3,3 -bis(ethoxymethyl)oxetane) and other novel polyethers
[AD-A142606] N84-30081
COPPER ALLOYS
Tantalum-copper alloy and method for making
[DE84-011081] N84-30037
COPPER CHLORIDES
Spray pyrolysis of cadmium sulfide/copper indium selenide cells
[DE84-004491] N84-30537
COPPER OXIDES
Polarization of paraexciton luminescence in Cu2O crystals in magnetic field . N84-30870
COPPER SELENIDES
Low cost, sprayed CuInSe2 solar cell research
[DE84-010480] N84-30533
Spray pyrolysis of cadmium sulfide/copper indium selenide cells
[DE84-004491] N84-30537
CORIOLIS EFFECT
High-spin gamma-ray spectroscopy
[DE84-010716] N84-30929
CORONAS
Dynamics of plasma corona on spherical targets irradiated by laser N84-30878
CORRECTION
An overview of the Thematic Mapper geometric correction system N84-30367
CORRELATION
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30892
CORROSION
Potential-determining reactions during pitting corrosion of aluminum
[DE84-007695] N84-30031
Environmental assisted fracture of cast and wrought steels in brine
[DE84-011870] N84-30058
CORROSION PREVENTION
Hydrogen fluoride formation and metal corrosion in freon-contaminated propellants N84-29921
CORROSION RESISTANCE
Cadmium plating versus other coatings to prevent corrosion
[AD-A142504] N84-30022
Ductile aluminide alloys for high temperature applications
[DE84-011037] N84-30038
Corrosion of unalloyed steels in different alkaline solutions at high temperatures and under high pressures
[S/T-REPT-VOL-1-NO-1] N84-30060
Quality control analysis of TA-23 glass seals for lithium ambient temperature batteries
[DE84-011719] N84-30094
Corrosion resistance of selected ceramic materials to nitric acid
[PB84-178870] N84-30098
CORROSION TESTS
Corrosion of unalloyed steels in different alkaline solutions at high temperatures and under high pressures
[S/T-REPT-VOL-1-NO-1] N84-30060
CORTISONE
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682
COSMIC DUST
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069
COSMIC RAYS
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081
COST ANALYSIS
Cost/risk analysis for disk retirement, volume 1
[AD-A141978] N84-29881
Economics of a conceptual 75 MW hot dry rock geothermal electric power station
[DE83-015926] N84-30539
Improving system affordability
[AD-A142387] N84-31062
COST EFFECTIVENESS
Remote sensing and the private sector: Issues for discussion
[PB84-160777] N84-30520
Multi-100kW: Planar low cost solar array development
[NASA-CR-171119] N84-30529
Technical and cost potential for lightweight, stretched-membrane heliostat technology
[DE84-004433] N84-30543
Computer science and technology: Report on approaches to database translation
[NBS-SP-500-115] N84-30739
Computer science and technology: Introduction to software packages
[NBS-SP-500-114] N84-30740
COST REDUCTION
Multi-100kW: Planar low cost solar array development
[NASA-CR-171119] N84-30529
COSTS
Engineering research on positive displacement gas expanders, phase 1
[DE84-008977] N84-30310
COUPLING
Hierarchial command, control and coupled bilinear systems
[AD-A142401] N84-30823
Non-geometrical optics investigation of mode conversion in weekly relativistic inhomogeneous plasmas
[DE84-012396] N84-31002
COVERINGS
Role of trench caps in the shallow land burial of low level wastes
[DE84-011824] N84-30944
CRACK CLOSURE
Near-threshold fatigue crack propagation: A perspective on the role of crack closure
[DE84-009669] N84-30202
CRACK PROPAGATION
Fatigue behavior of long and short cracks in wrought and powder aluminum alloys
[AD-A142609] N84-30024
Intergranular failures of Alloy 600 in high temperature caustic environments
[DE84-010890] N84-30032
Aeronautical Materials (selected articles)
[AD-A139952] N84-30063
Influence of temperature on the Delta K sub th and da/dN of LY-12CS aluminum alloy N84-30067
Preliminary investigation of fatigue crack propagation of 30CrMnSiA steel in salt spray corrosion conditions
N84-30068
Study of the fatigue crack propagation characteristics of YB-3 and YB-4 aeronautical organic glass
N84-30069
The effects of non-metallic inclusions in steel on fatigue properties N84-30070
Characteristics of initial period fatigue crack propagation of metals and its affecting factors N84-30071
Near-threshold fatigue crack propagation: A perspective on the role of crack closure
[DE84-009669] N84-30202

Calculation of crack behaviour on exposure to thermal shock
[BLL-RISLEY-TR-4941-(9091.9F)] N84-30326
Methods for analysis of cracks in three-dimensional solids
[NASA-TM-88266] N84-30330
Effects of variations in coldworking repair procedures on flaw growth and structural life
[AD-A141966] N84-30336
Criterion for quasibrittle crack growth
[DE84-010052] N84-30349
Space nuclear safety program
[DE84-011015] N84-30943
Electrolytic degradation of lithia-stabilized polycrystalline beta-alumina
[DE84-008668] N84-31027

CRACKING (FRACTURING)
J-integral tearing instability analysis for 8-inch diameter ASTM A106 steel pipe
[AD-A142589] N84-30023
The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings
[MRL-R-924] N84-30332

CRACKS
Near-threshold fatigue crack propagation: A perspective on the role of crack closure
[DE84-009669] N84-30202
Flaw detection reliability criteria. Volume 1: Methods and results
[AD-A142001] N84-30320
Solving crack problems with analytical techniques and the finite elements method
[BLL-RISLEY-TR-4940-(9091.9F)] N84-30325
Tensile crack exposure tests. Statistical analysis of the long-term durability of series B beams
[AD-A141955] N84-30335
A new optical technique for rapid determination of creep and fatigue thresholds at high temperature
[AD-A142675] N84-30341

CRASHWORTHINESS
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868
Impact dynamics research on composite transport structures N84-29975

CRATERS
Stratigraphic and volcano-tectonic relations of Crater Flat Tuff and some older volcanic units, Nye County, Nevada
[DE84-010926] N84-30584

CRAY COMPUTERS
TOPAZ: A finite element heat conduction code for analyzing 2-D solids
[DE84-010676] N84-30247

CREEP PROPERTIES
Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy
[DE84-011458] N84-30028
Creep-fatique and temperature synergisms in alloy 800
[DE84-010131] N84-30046
A new optical technique for rapid determination of creep and fatigue thresholds at high temperature
[AD-A142675] N84-30341

CREEP RUPTURE STRENGTH
Experimental research facility for creep-rupture testing of tantalum alloy T-111
[DE84-012030] N84-30036

CRITERIA
Flaw detection reliability criteria. Volume 1: Methods and results
[AD-A142001] N84-30320
A simulation technique for checking the circle criterion — linear systems stability
[RR-248] N84-30733

CRITICAL FLOW
Stability of tubes conveying fluid
[DE84-010573] N84-30240

CROP IDENTIFICATION
Thematic Mapper spectral dimensionality and data structure N84-30387
An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414

CROSS COUPLING
A theory for cross-coupling in ultrasonic transducer arrays
[DE84-010327] N84-30259

CROSSTALK
The present status of Clean PAL systems
[BBC-RD-1984/6] N84-30142

CRUDE OIL
The toxicity of petroleum and shale JP5
[AD-A142670] N84-30690

CRYOGENIC EQUIPMENT
Development of a 6-component balance for the cryogenic range
[BMFT-FB-W-84-022] N84-30270

CRYOGENIC FLUID STORAGE
Experimental study on porous-plug phase seperator for superfluid He2
[ISAS-612] N84-31006

CRYOGENIC WIND TUNNELS
Development of a 6-component balance for the cryogenic range
[BMFT-FB-W-84-022] N84-30270

CRYOGENICS
Influence of processing on the cryogenic mechanical properties of high strength high manganese stainless steel
[DE84-008242] N84-30027

CRYSTAL DEFECTS
Measurement techniques for high-power semiconductor materials and devices
[DE84-010425] N84-31016
Defect production efficiencies in thermal neutron irradiated copper and molybdenum
[DE84-010993] N84-31018

CRYSTAL FILTERS
Strategic blue-green communication filters
[AD-A142353] N84-30151

CRYSTAL GROWTH
Transient and diffusion analysis of HgCdTe
[NASA-CR-162049] N84-30015
Directional growth of pearlite in Fe-C eutectiod alloys
[DE84-007368] N84-30042

CRYSTAL LATTICES
Computer simulation studies of sputtering and multimer formation from clean and oxygen reacted surfaces of titanium, vanadium and niobium
[AD-A141998] N84-31009
Static frequency-temperature characteristics of doubly rotated quartz
[AD-A142456] N84-31013
Renormalized action improvements
[DE84-011810] N84-31028

CRYSTAL STRUCTURE
Macrocycles containing tin. Synthesis and structure of 1,10-Diphenyl-1,10-Distannabicycle (8.8.8)Hexacosane
[AD-A142703] N84-29966
Thin film synthesis of superconducting chemical compounds
[AD-A142541] N84-29992
Thermomechanical processing and texture development in Ni-Cr-Mo and Mn-Mo-B armor steels
[AD-A142352] N84-30020
Renormalized action improvements
[DE84-011810] N84-31028

CRYSTALLINITY
Crystalline-state extrusion of low density polyethylenes
[AD-A142017] N84-30075
Characterization of block copolymers based on poly(3,3 -bis(ethoxymethyl)oxetane) and other novel polyethers
[AD-A142606] N84-30081

CRYSTALLOGRAPHY
Characterization of the microstructures of various materials
[AD-A141946] N84-30017

CRYSTALS
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30662
Microspectrophotometer for crystal analysis by absorption reflectometry N84-30683

CULTURE TECHNIQUES
Nutritional and environmental factors in ethanol fermentation by Saccharomyces cerevisiae
[DE84-009693] N84-30110

CURING
Residual curing stress of carbon-resin composites
[ONERA-RT-6/3521-M] N84-29980

CURRENT DENSITY
Mixed mode operation in CTX
[DE84-007493] N84-30985

CURVATURE
The curvature primal sketch
[AD-A142460] N84-30827

CYBERNETICS
Parallelism in manipulator dynamics. Revision
[AD-A142515] N84-30299

CYCLES
Dependence of crustal structure of eastern Pacific Ocean on its age N84-30483
Developments of research on prediction of earthquakes, tsunami and volcanic eruptions in Far East N84-30485
Global Biology Research Program: Biogeochemical Processes in Wetlands
[NASA-CP-2316] N84-30665
Executive summary: Background N84-30666
Geographic distribution of wetland parameters: The foundation of a data base N84-30667
A framework for wetlands research: Development of a wetlands data base N84-30668

CYCLIC ACCELERATORS
Dual aperture dipole magnet with second harmonic component
[DE84-011305] N84-30656

CYCLIC COMPOUNDS
Macrocycles containing tin. Synthesis and structure of 1,10-Diphenyl-1,10-Distannabicycle (8.8.8)Hexacosane
[AD-A142703] N84-29966

CYCLIC LOADS
Elastic-plastic deformation of pulse-loaded structures
[AD-A142350] N84-30339
Interactive computer analysis methods for predicting the inelastic cyclic behaviour of structural sections
[PB84-192012] N84-30358

CYCLONES
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596

CYCLOTRON FREQUENCY
Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900

CYCLOTRON RADIATION
Electron cyclotron radiation from mirror-confined plasma
[DE84-008665] N84-30970

CYCLOTRON RESONANCE
Density variation due to wave heating in Tokamak plasmas
[DE84-009402] N84-30993
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010842] N84-30999
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas
[DE84-012396] N84-31002

CYLINDERS
Solving crack problems with analytical techniques and the finite elements method
[BLL-RISLEY-TR-4940-(9091.9F)] N84-30325

CYLINDRICAL SHELLS
Instability of collapsing cylindrical shell during magnetic energy density N84-30672

CYTOGENESIS
International Workshop on Biophysical Correlates of Cellular Function UNESCO
[AD-A142490] N84-30671

CYTOPLASM
International Workshop on Biophysical Correlates of Cellular Function UNESCO
[AD-A142490] N84-30671

CZOCHRALSKI METHOD
Silicon crystal growing by oscillating crucible technique
[DE84-011038] N84-31019

D

DAMAGE
Tensile strength of composite sheets with unidirectional stringers and crack-like damage N84-29974
Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681

DAMAGE ASSESSMENT
Cost/risk analysis for disk retirement, volume 1
[AD-A141978] N84-29881

DAMPING
Invention of a tunable damper for use with an acoustic waveguide in hostile environments
[DE84-013109] N84-30697
Comparison of some SSC beam parameters for pp and anti pp
[DE84-010729] N84-30908
Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

DATA ACQUISITION
A data acquisition and real-time display system for testing a jet engine compressor
[AD-A142696] N84-30301
Scan-angle and detector effects in Thematic Mapper radiometry N84-30386
Status of the ESA-Earthnet LANDSAT-4 TM ground processing chain N84-30391
Earth Observing System, conclusions and recommendations N84-30454
Chesapeake Bay nutrient dynamics study
[PB84-190982] N84-30524
Documentation of wave-height and tidal analysis programs for automated data acquisition and control systems
[AD-A142679] N84-30634

Review of the Third Biennial Conference on Real-Time Computer Applications in Nuclear and Particle Physics
[DE84-002457] N84-30720
A user-oriented laboratory data entry computer system designed to reduce errors
[DE84-011901] N84-30730
Interfacing CAMAC to a high-speed multiprocessor bit slice data-acquisition system
[DE84-009986] N84-30780
Selected bibliography of solar thermal literature. Volume 1: Bibliography
[DE84-011386] N84-31052
Appropriate technology management information system
[DE84-010952] N84-31056
Solar Radiation Data Directory: A guide to solar radiation and meteorological data collection activities in the US
[DE84-000095] N84-31057

DATA BASE MANAGEMENT SYSTEMS
Report on functional design specification for the automated alphanumeric data entry system
[AD-A142516] N84-30725
Computer science and technology: Report on approaches to database translation
[NBS-SP-500-115] N84-30739
Enhancements to the codata definition language
[DE84-010579] N84-30783
The application of a general purpose data base management system to design automation
[AD-A141999] N84-31048
Common data input-retrieval system
[DE84-010972] N84-31053
DBMS conversion case study
[DE84-011205] N84-31054

DATA BASES
Flight characteristics of a manned, low-speed, controlled deep stall vehicle
[NASA-TM-86041] N84-29863
Data integrity factors affecting the construction of the mapping, charting, and geodesy data base
[NASA-CR-173835] N84-30511
Shelf mounted ocean thermal energy conversion platform, revised preliminary report
[PB84-185230] N84-30551
Zones
[PB84-174325] N84-30616
Global Biology Research Program: Biogeochemical Processes in Wetlands
[NASA-CP-2316] N84-30665
A framework for wetlands research: Development of a wetlands data base N84-30668
DCP (Distributed software engineering control process): Experience in bootstrapping an Ada (trademark) environment
[AD-P003424] N84-30756
The application of a general purpose data base management system to design automation
[AD-A141999] N84-31048
Defense Technical Information Center referral data bank directory
[AD-A138400] N84-31051
Common data base experiment: Detection and location capacity
[FOA-C-20538-T1] N84-31058

DATA COMPRESSION
Interfacing CAMAC to a high-speed multiprocessor bit slice data-acquisition system
[DE84-009986] N84-30780
Three image compression algorithms for Compression and Decompression of Imaging Sensor Signals (CADISS)
[NLR-MP-83027-U] N84-30791

DATA CORRELATION
Study of high performance alloy electroforming
[NASA-CR-173828] N84-30013
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1
[E84-10166] N84-30359
Thematic Mapper (TM) instrument description N84-30363
An overview of LANDSAT-4 and the Thematic Mapper N84-30364
An overview of the Thematic Mapper geometric correction system N84-30367
A comparison between Lageos laser ranging and VLBI determined baselines N84-30459
Reliability and efficiency of Kubicek rheographic method for monitoring cardiac output and stroke volume N84-30644
Blood plasma free amino acids under hypokinetic conditions N84-30648

DATA LINKS
Augmenting computer networks
[NASA-CR-172399] N84-30800

DATA MANAGEMENT
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers' guide: Volume 1
[AD-A142430] N84-30766

DATA PROCESSING
Microprocessor automation for the Dynaflect Deflection Measuring System
[PB84-180413] N84-30135
Radiometric calibration and processing procedure for reflective bands on LANDSAT-4 protoflight Thematic Mapper N84-30366
Raster processing for regional planning tasks N84-30507
Data integrity factors affecting the construction of the mapping, charting, and geodesy data base
[NASA-CR-173835] N84-30511
Climatological Summary Programs F6 and CLIMAT
[PB84-185941] N84-30603
Review of the Third Biennial Conference on Real-Time Computer Applications in Nuclear and Particle Physics
[DE84-002457] N84-30720
A user-oriented laboratory data entry computer system designed to reduce errors
[DE84-011901] N84-30730
Guideline for computer security certification and accreditation. Category: ADP (Automatic Data Processing) operations. Subcategory: Computer security. Federal information processing standards
[FIPS-PUB-102] N84-30736
Computer science and technology: Introduction to software packages
[NBS-SP-500-114] N84-30740
WC user's guide
[DE84-009242] N84-30784
Graphics workstation switching unit
[DE84-011626] N84-30788
Argonne integrated heterogeneous file transfer network
[DE84-012092] N84-30803
Development of a document preparation staff within an office automation environment
[DE84-008649] N84-31041

DATA REDUCTION
Testing, data analysis and engineering services on lead-acid load leveling batteries
[DE84-011523] N84-30198
Review of the Third Biennial Conference on Real-Time Computer Applications in Nuclear and Particle Physics
[DE84-002457] N84-30720

DATA RETRIEVAL
Data integrity factors affecting the construction of the mapping, charting, and geodesy data base
[NASA-CR-173835] N84-30511
Verification of asynchronous transmissions
[PB84-189885] N84-30738

DATA SAMPLING
Multispectral Scanner (MSS) instrument description N84-30362

DATA STRUCTURES
Syntax and semantics of a LINCS control monologue
[DE84-011399] N84-30805

DATA SYSTEMS
Selection of a general purpose language and a real-time language suitable for shipboard data system 3
[PB84-180692] N84-30795

DATA TRANSMISSION
Verification of asynchronous transmissions
[PB84-189885] N84-30738
Computer science and technology: Report on approaches to database translation
[NBS-SP-500-115] N84-30739
Graphics workstation switching unit
[DE84-011626] N84-30788
Argonne integrated heterogeneous file transfer network
[DE84-012092] N84-30803
Syntax and semantics of a LINCS control monologue
[DE84-011399] N84-30805
Serial link protocol design: A critique of the X.25 standard, level 2
[DE84-002724] N84-30806

DEATH VALLEY (CA)
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416

DECAY
Experiments and theory on half-harmonic light and 2-plasmon decay
[DE84-008945] N84-30276
The 19th Moriond meeting: Summary talk
[DE84-010053] N84-31072

DECISION MAKING
The representation of part-whole information in memory
[PB84-180140] N84-30701
Supervisory control: Introduction and theory — industrial plant control N84-30706
Fault management N84-30709
Treatment of patients with a lesion of the brachial plexus N84-30712
Interaction of human cognitive models and computer-based models in supervisory control
[AD-A142677] N84-30717
Network repair level analysis model user's guide
[AD-A141991] N84-30743

DECISION THEORY
Supervisory control: Introduction and theory — industrial plant control N84-30706
Interaction of human cognitive models and computer-based models in supervisory control
[AD-A142677] N84-30717

DECOMPOSITION
High resolution electron microscopy studies of the early stages of decomposition in alloys and ceramics
[DE84-020802] N84-30087
Singular value decomposition with systolic arrays
[NASA-CR-172396] N84-30817

DECOMPRESSION SICKNESS
Ultrasonography of canine soft tissues during decompression N84-30653

DECOUPLING
Nulling in array patterns with orthogonal analytic cancellation beams
[AD-A142719] N84-30166

DEEP SPACE
A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems
[AD-A141136] N84-29898

DEFECTS
Flaw detection reliability criteria. Volume 1: Methods and results
[AD-A142001] N84-30320

DEFENSE PROGRAM
Evolution and flight history of the Defense Meteorological Satellite Program (DMSP) propulsion module N84-29917
Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense
[AD-A141982] N84-30721
Defense Technical Information Center referral data bank directory
[AD-A138400] N84-31051

DEFLECTION
Elastic-plastic deformation of pulse-loaded structures
[AD-A142350] N84-30339

DEFORMATION
Effects of bond deterioration on hysteretic behavior of reinforced concrete joints
[PB84-192020] N84-30343
Local bond stress-slip relationships of deformed bars under generalized excitations: Experimental results and analytical model
[PB84-192848] N84-30355
Geodynamics of crustal deformation and seismotectonic block movements in central Europe N84-30460
Computational method for thermoviscoelasticity with application to rock mechanics
[DE84-003087] N84-30585
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
Dynamics of plasma corona on spherical targets irradiated by laser N84-30878

DEGRADATION
A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919
Purification of nitrogen tetroxide for long-term reliability N84-29920
Effects of water-vapor on friction and deformation of polymeric magnetic media in contact with a ceramic oxide
[NASA-TM-83727] N84-30072
Electrolytic degradation of lithia-stabilized polycrystalline beta-alumina
[DE84-006668] N84-31027

DEGREES OF FREEDOM
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29981

DELAWARE
Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data N84-30419

DELAY
Decentralized estimation in communication networks with delay
[AD-A142376] N84-30155

DELAY LINES
Propagation loss in electrostatically variable SAW delay lines
[AD-A142433] N84-30183
DELINEATION
Delineation of wetland boundaries using vegetation within the Altamaha River Basin of Georgia
[AD-A142590] N84-30515
DELTA WINGS
Surface disturbances due to trailing vortices
[AD-A142693] N84-30233
DEMAGNETIZATION
Biasing and fast degaussing circuit for magnetic materials
[DE84-011281] N84-30657
DENSITY (MASS/VOLUME)
Crystalline-state extrusion of low density polyethylenes
[AD-A142017] N84-30075
DENSITY DISTRIBUTION
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma
[IPPJ-674] N84-30966
Computer simulation studies of sputtering and multimer formation from clean and oxygen reacted surfaces of titanium, vanadium and niobium
[AD-A141998] N84-31009
DEOXYRIBONUCLEIC ACID
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680
DEPOSITION
Aspects of electroless nickel plating on molybdenum
[DE84-006434] N84-30057
Air pollution effects on aquatic ecosystems: Summary of a symposium
[PB84-185214] N84-30562
DESERTS
Desert emergency - lack of water - how to find and collect water. Plants and human survival in the desert
[AD-A142025] N84-30513
DESIGN
Design of a safety monitor system for high explosives machining
[DE84-010101] N84-30113
General-purpose RFQ design program
[DE84-011327] N84-30165
DESIGN ANALYSIS
Shuttle orbiter main propulsion system hardware development and certification for flight N84-29907
An experimental study of helical guide-type rotating heat pipe N84-30123
Propagation loss in electrostatically variable SAW delay lines
[AD-A142433] N84-30183
Testament of general boundary conditions and point-wise state variable constraints in optimum design for static and dynamic response
[PB84-192749] N84-30356
LANDSAT-4 system description N84-30361
Multispectral Scanner (MSS) instrument description N84-30362
An overview of LANDSAT-4 and the Thematic Mapper N84-30364
Thematic Mapper sensor characteristics N84-30365
Speculations on the future of test design
[AD-A142662] N84-30699
Some design guidelines and discrete-time adaptive controllers
[NASA-CR-173800] N84-30808
New directions in linear accelerators
[DE84-011412] N84-30911
DESORPTION
Method of enhancing selective isotope desorption from metals
[DE84-011031] N84-30044
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557
DETECTION
Void-particulate director
[DE84-011300] N84-30262
DETONATION
Experimental facilities to study hydrogen combustion and detonation
[DE84-008998] N84-29997
High performance Extrusion Cast Explosives (ECK)
[DE84-008244] N84-30107
Energy release and fluid dynamics in multiphase systems
[AD-A142402] N84-30228
Numerical simulations of the structure and propagation of self-sustained detonations
[AD-A142486] N84-30230
DETONATION WAVES
Numerical and analytical studies of steady detonation waves with expansion losses
[AD-A142601] N84-30232
NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures
[AD-A142290] N84-30337
DEUTERIUM
Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918
DIAGNOSIS
Electron beam diagnostic for the Los Alamos free electron laser oscillator experiment
[DE84-011348] N84-30278
DIAMONDS
Mechanical interactions of rough surfaces
[DE84-008589] N84-30311
DIATOMIC GASES
Freejets of rotationally relaxing diatomic gases N84-30119
DIELECTRICS
Wave attenuation and mode dispersion in a waveguide coated with lossy dielectric material
[NASA-CR-173820] N84-30145
A study of distributed millimeter-wave isolators
[AD-A142729] N84-30189
Negative ion formation in SF6 spark by-products
[DE84-012340] N84-30212
Characterization of micron-sized, optical coating defects by photothermal deflection microscopy
[DE84-011150] N84-30960
DIESEL ENGINES
High-temperature lubricants for minimum-cooled diesel engines
[AD-A142426] N84-30078
Utilization of SRC-2 fuel in an insulated diesel engine
[DE84-004386] N84-30111
Scope for active noise abatement in vehicle diesel engines
[BLL-M-28767-(5825.4)] N84-30685
DIESEL FUELS
Utilization of SRC-2 fuel in an insulated diesel engine
[DE84-004386] N84-30111
DIFFERENTIAL EQUATIONS
Europe approaches chaos with electrical circuits
[AD-A142085] N84-30179
Legendre-tau approximation for functional differential equations. Part 2: The linear quadratic optimal control problem
[NASA-CR-172397] N84-30818
Study of nonlinear singular systems
[AD-A142348] N84-30820
Techniques for large sparse systems arising from continuation methods
[DE84-010410] N84-30833
Hamiltonian structure of field-line equations
[DE84-011019] N84-30836
Monte Carlo simulation of the microcanonical ensemble
[DE84-010880] N84-30923
DIFFRACTION
Switchable zero order diffraction gratings as light valves
[AD-A142513] N84-30953
DIFFRACTION PATTERNS
The Spot of Arago and its role in aberration analysis
[AD-A141983] N84-30952
DIFFUSION
Scientific analysis of existing data on aerosol dispersion and transport in a mountain valley
[AD-A142013] N84-30555
Applied mathematics of transport theory
[DE84-011486] N84-30838
Cation self-diffusion in Fe2O3
[DE84-009152] N84-31025
DIFFUSION COEFFICIENT
Transient and diffusion analysis of HgCdTe
[NASA-CR-162049] N84-30015
DIGITAL DATA
TM digital image products for applications N84-30371
A preliminary analysis of LANDSAT-4 Thematic Mapper radiometric performance N84-30379
Data integrity factors affecting the construction of the mapping, charting, and geodesy data base
[NASA-CR-173835] N84-30511
DIGITAL FILTERS
Filtering of the colour-difference signals in 4:2:2 YUV digital video coding systems
[BBC-RD-1984/4] N84-30141
DIGITAL SIMULATION
Thematic Mapper spectral dimensionality and data structure N84-30387
DIGITAL SYSTEMS
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29679
Filtering of the colour-difference signals in 4:2:2 YUV digital video coding systems
[BBC-RD-1984/4] N84-30141
Performance of digital communications over selective fading channels
[AD-A142427] N84-30158
A method of measuring distortion noise in digital audio equipment
[NHK-LABS-NOTE-299] N84-30174
Two-way unidirectional condenser microphone
[NHK-LABS-NOTE-297] N84-30175
A simulation program with latency exploitation for the transient analysis of digital circuits
[AD-A142377] N84-30181
DIRAC EQUATION
Spinorial relativistic rotator: The transformation from quasi-Newtonian to Minokowski coordinates
[DE84-009091] N84-30839
DIRECTIONAL SOLIDIFICATION (CRYSTALS)
Transient and diffusion analysis of HgCdTe
[NASA-CR-162049] N84-30015
Aeronautical Materials (selected articles)
[AD-A139952] N84-30063
Influences of directionally solidified techniques and hafnium content on a nickel base high temperature alloy N84-30064
DIRECTIVITY
Two-way unidirectional condenser microphone
[NHK-LABS-NOTE-297] N84-30175
DIRECTORIES
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512
Defense Technical Information Center referral data bank directory
[AD-A138400] N84-31051
Solar Radiation Data Directory: A guide to solar radiation and meteorological data collection activities in the US
[DE84-000095] N84-31057
DISASTERS
Third World Congress on Emergency and Disaster Medicine
[FOA-C-52005-H4] N84-30692
DISCRETE FUNCTIONS
The complexity of sorting on distributed systems
[AD-A142415] N84-30825
DISPERSING
The evaporation and gaseous dispersion of large-scale releases of nitrogen tetroxide
[AD-A142079] N84-30104
Simulation of powder distribution in IITRI bag experiments
[AD-A141941] N84-30128
DISPERSIONS
Formation of dispersions of rare earth oxides in titanium alloys using rapid solidification processing
[DE84-006664] N84-30048
DISPLAY DEVICES
Simulator evaluation of a remotely piloted vehicle lateral landing task using a visual display
[NASA-TM-85903] N84-29685
A data acquisition and real-time display system for testing a jet engine compressor
[AD-A142696] N84-30301
Operator performance on flat-panel displays with line and cell failures
[AD-A142340] N84-30716
DISSOCIATION
Pulsed-laser atom-probe studies of surface chemical reactions
[DE84-012811] N84-30007
Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680
DISSOLVED GASES
Measurements of dissolved gases at Corps of Engineers projects
[AD-A142727] N84-30130
DISSOLVING
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557
DISTORTION
A method of measuring distortion noise in digital audio equipment
[NHK-LABS-NOTE-299] N84-30174
DISTRIBUTED PARAMETER SYSTEMS
Approximation techniques for parameter estimation and feedback control for distributed models of large flexible structures
[NASA-CR-172411] N84-29903

Control theory of partial differential equations [AD-A142636] N84-30812
Analysis and control of a class of stiff linear distributed systems [AD-A142364] N84-30821

DISTRIBUTED PROCESSING
Performance measurement in a distributed processing environment [AD-A142410] N84-30722
An Ada (trademark) network: A real-time distributed computer system [AD-P003423] N84-30755
DCP (Distributed software engineering control process): Experience in bootstrapping an Ada (trademark) environment [AD-P003424] N84-30756
The complexity of sorting on distributed systems [AD-A142415] N84-30825
Inductive information retrieval using parallel distributed computation [AD-A142712] N84-31050

DISTRIBUTION (PROPERTY)
Simulation of powder distribution in IITRI bag experiments [AD-A141941] N84-30128

DISTRIBUTION FUNCTIONS
A retrievable recipe for inverse t [AD-A142557] N84-30829
Acceleration of ions and electrons by wave-particle interactions [AD-A142341] N84-30900
Theoretical studies of Elma Bumpy Torus (EBT) [DE84-010814] N84-30978
Microstability theory for distributions separable in energy and pitch angle [DE84-009663] N84-30991

DISTRICT OF COLUMBIA
An analysis LANDSAT-4 Thematic Mapper geometric properties N84-30392
The use of linear feature detection to investigate Thematic Mapper data performance and processing N84-30393

DIURNAL VARIATIONS
Soil moisture from temperature measurements at the Earth's surface, update N84-30474
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model [NASA-TM-86265] N84-30566
Monthly mean determination of the solar semidiurnal surface pressure oscillation at Batavia from 1866 through 1944 [PB84-184795] N84-30593

DIVERTERS
Plasma in divertor during intense recycling N84-30877
The use of isotopically-enriched carbon probes for erosion deposition measurements in the ASDEX divertor [DE84-012329] N84-31006

DOCUMENT STORAGE
Weapons file [AD-A142506] N84-29867

DOCUMENTS
Defense Technical Information Center referral data bank directory [AD-A138400] N84-31051
Information Center Complex publications and presentations, 1971-1982 [DE84-010603] N84-31055

DOGS
Laboratory for Energy Related Health Research [DE84-000529] N84-30672

DOMAIN WALL
Elastic domain wall waves in ferroelectric ceramics and single crystals [AD-A142393] N84-31011

DOMAINS
Grid-size reduction in flow calculations on infinite domains by higher-order far-field asymptotics in numerical boundary conditions [NLR-MP-83029-U] N84-30253

DOORS
Fire induced flows through room openings - flow coefficients [PB84-176759] N84-30011

DOPPLER NAVIGATION
AN/APN-128 Lightweight Doppler Navigation System (LDNS) case study report (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study [AD-A142072] N84-29860

DOSAGE
Organophosphate toxicity: Genetics, receptors, and antidotes [AD-A141059] N84-30685

DOSIMETERS
Inventory RF radiation levels in the Netherlands, part 1 [LEOK-TR-1984-02-PT-1] N84-30167

DRAFTING (DRAWING)
DIGMAP, an interactive graphic support system for mine survey N84-30496
Software research for computer aided cartography at the Berlin Technical University N84-30503

DRAINAGE
Some physical concepts in complex terrain meteorology derived from the Department of Energy's ASCOT program [DE84-010059] N84-30607

DROPS (LIQUIDS)
Comparison of icing cloud instruments for 1982-1983 icing season flight program [NASA-TM-83569] N84-29870
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets N84-29963

DUCTILITY
Ring ductility of irradiated Inconel 706 and Nimonic PE16 [DE84-010397] N84-30034
Ductile aluminide alloys for high temperature applications [DE84-011037] N84-30038

DURABILITY
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures [AD-A142424] N84-29866
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970
Worldwide flight and ground-based exposure of composite materials N84-29971

DUST
Explosion parameters of ferroalloy dusts [BLL-M-35571-(5828.4)] N84-30102
Dust particles in high speed flows: Calculations of small particle reentry hydrodynamics [DE84-010996] N84-30245

DYNAMIC CHARACTERISTICS
A method of measuring distortion noise in digital audio equipment [NHK-LABS-NOTE-299] N84-30174

DYNAMIC CONTROL
Control systems design for linear dynamic systems using simple models: Some case studies. Part 1: The single-input/single-output case [RR-247-PT-1] N84-30134

DYNAMIC LOADS
Holographic FLI for detection of defects [AD-A142733] N84-30258

DYNAMIC RESPONSE
Seismic response for multicomponent earthquakes [PB84-193747] N84-30354
Testament of general boundary conditions and point-wise state variable constraints in optimum design for static and dynamic response [PB84-192749] N84-30356
System identification of structures with joint rotation [PB84-192210] N84-30357
Bond graph time simulations using extracted modal parameters from the Nova spaceframe [DE84-010916] N84-30779

DYNAMIC STRUCTURAL ANALYSIS
Durability methods development, volume 7 [AD-A142400] N84-29865
Dynamic synthesis and evaluation of spacecraft structures [ESA-STR-208] N84-29904
Stability of tubes conveying fluid [DE84-010573] N84-30240
Instrumenting and interpreting the time-varying response of structural systems [DE84-009067] N84-30346
Interactive computer analysis methods for predicting the inelastic cyclic behaviour of structural sections [PB84-192012] N84-30358

DYNAMOMETERS
Orientation of ergonomic aspects of the Universal Dynamometer Device — vehicle testing [IZF-1983-25] N84-30315

E

E REGION
High-latitude ionospheric irregularities [AD-A142648] N84-30573

EARTH (PLANET)
Global hydrologic cycle N84-30434
Oceanic transport N84-30444
Verification of the accuracy of GEM-L2 in response to criticism by Lambeck and Coleman N84-30466
Effect of antiscreening of outgoing thermal radiation by cloud cover N84-30490
The Earth's radiation belts [AD-A142673] N84-30574
Worldwide energy resource distribution estimates [DE84-012216] N84-30612
Cosmic bombardment [DE84-011402] N84-31071

EARTH ALBEDO
Snow reflectance from LANDSAT-4 Thematic Mapper N84-30426
Lageos orbit and the albedo problem N84-30464

EARTH ATMOSPHERE
Sea ice N84-30446

EARTH CORE
Interior of the Earth N84-30443

EARTH CRUST
Interior of the Earth N84-30443
Research activities of the Geodynamics Branch [NASA-TM-86123] N84-30455
Crustal deformation and earthquakes N84-30457
Results of laser ranging collocations during 1983 N84-30458
A comparison between Lageos laser ranging and VLBI determined baselines N84-30459
Geodynamics of crustal deformation and seismotectonic block movements in central Europe N84-30460
Geodynamics: Introduction and background N84-30476
Projection for space geodynamics, 1988-1998 N84-30477
Dependence of crustal structure of eastern Pacific Ocean on its age N84-30483

EARTH MANTLE
Structure of ocean floor in relation to conditions for formation of lithosphere N84-30484

EARTH MOVEMENTS
Update: San Andreas Fault experiment N84-30456
Geokinetic effects on motion sensitive instrumentation, systems and facilities [AD-A142682] N84-30575
Proceedings of Tsunami Symposium [PB84-183482] N84-30638

EARTH OBSERVATIONS (FROM SPACE)
Interior of the Earth N84-30443
Oceanic transport N84-30444
Polar glaciology N84-30445
Sea ice N84-30446
Tropospheric science N84-30447
Middle atmospheric science N84-30448
Aeronomy N84-30449
Earth Observing System. Science and mission requirements, volume 1, part 1 [NASA-TM-86129-VOL-1-PT-1] N84-30450
Implementation strategy N84-30453
Geodynamics: Introduction and background N84-30476

EARTH ORBITS
Observational requirements and measurement systems concepts N84-30452

EARTH RESOURCES
Earth Observing System. Science and mission requirements, volume 1, part 1 [NASA-TM-86129-VOL-1-PT-1] N84-30450

EARTH ROTATION
Sensitivity of SLR baselines to errors in Earth orientation N84-30461
Analysis of the Earth's variable rotation N84-30462
Changes in Earth's rotation rate caused by zonal tide and their manifestations in atmospheric pressure field N84-30487

EARTH SURFACE
Soil moisture from temperature measurements at the Earth's surface, update N84-30474

EARTH TIDES
Changes in Earth's rotation rate caused by zonal tide and their manifestations in atmospheric pressure field N84-30487
Omnidirectional fiber optic tiltmeter [DE84-011109] N84-30959

EARTHQUAKE DAMAGE
Stronger direction needed for the National Earthquake Program [GAO/RCED-83-103] N84-30570

EARTHQUAKES
Seismic response for multicomponent earthquakes [PB84-193747] N84-30354
Crustal deformation and earthquakes N84-30457
Developments of research on prediction of earthquakes, tsunami and volcanic eruptions in Far East N84-30485
Seismicity of the Paradox Basin and the Colorado Plateau interior [DE84-011620] N84-30516

Stronger direction needed for the National Earthquake Program
[GAO/RCED-83-103] N84-30570
MULAP4: A multi-linear analysis program for ground motion studies of horizontally layered systems
[PB84-182815] N84-30591

ECOLOGY
In-stream distribution and hydraulic and ecological effects of volcanic ash from Mount St. Helens eruption
[PB84-169382] N84-30526
Vertebrate behavior and ecology
[DE84-007318] N84-30673
Information Center Complex publications and presentations, 1971-1982
[DE84-010603] N84-31055

ECONOMIC ANALYSIS
SSME modifications for on-demand launch vehicles
N84-29914
Photovoltaic concentrators: Present status and future role
[DE84-005520] N84-30532
Stronger direction needed for the National Earthquake Program
[GAO/RCED-83-103] N84-30570
Chronic effects of repeated mechanical trauma to the skin: A description of the problem in the workplace
[PB84-181767] N84-30695

ECONOMIC DEVELOPMENT
Policy implications of information technology
[PB84-183219] N84-31060

ECONOMIC FACTORS
The changing airline industry: A status report through 1982
[GAO/RCED-83-179] N84-29858

ECOSYSTEMS
Biogeochemical considerations N84-30436
Inland aquatic resources and biogeochemical cycles
N84-30438
Land biology N84-30440
In-stream distribution and hydraulic and ecological effects of volcanic ash from Mount St. Helens eruption
[PB84-169382] N84-30526
Air pollution effects on aquatic ecosystems: Summary of a symposium
[PB84-185214] N84-30562

EDGE DISLOCATIONS
Nonlocal continuum theory for dislocation and fracture
[AD-A142538] N84-30340

EDGES
COMEDG: A program to combine logically independent line segments into geometrically coherent lines
N84-30499

EDUCATION
Proceedings of the 2nd Annual Conference on Ada (Trademark) Technology
[AD-A142403] N84-30745
The Army Ada (trademark) education program
[AD-P003414] N84-30746
The US Army model Ada (trademark) training curriculum
[AD-P003415] N84-30747
Teaching Ada (trademark) at the US Military Academy
[AD-P003418] N84-30750
Experiences in teaching Ada (trademark)
[AD-P003419] N84-30751
Teach Ada (trademark) as the student's first programming language?
[AD-P003422] N84-30754
Operating system interface for Ada (trademark) instructors
[AD-P003433] N84-30765
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers exercise guide
[AD-A142429] N84-30767
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers' guide: Volume 1
[AD-A142430] N84-30768
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers guide: Volume 2
[AD-A142431] N84-30769
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers guide
[AD-A142432] N84-30770
National Science Foundation, volume 1
[PB84-193234] N84-31061

EFFICIENCY
Fuel savings potential of the NASA Advanced Turboprop Program
[NASA-TM-83736] N84-29878
High pressure LOX/natural gas staged combustion technology N84-29927
Engineering research on positive displacement gas expanders, phase 1
[DE84-008977] N84-30310
Technical and cost potential for lightweight, stretched-membrane heliostat technology
[DE84-004433] N84-30543
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery
[PB84-184894] N84-30550

EGRESS
Field repair of AH-1S helicopter window cutting assemblies
[NASA-TM-85831] N84-29864

EIGENVALUES
The ERODYN and QRPIG computer programs
N84-30468
Legendre-tau approximation for functional differential equations. Part 2: The linear quadratic optimal control problem
[NASA-CR-172397] N84-30818

EIGENVECTORS
The ERODYN and QRPIG computer programs
N84-30468

EJECTION SEATS
History of aircraft escape system propulsion
N84-29941
Propulsion in a life-saving role for ACES 2
N84-29942
The Stencel S4S ejection seat: A study in new pyrotechnic developments N84-29943
Crest: Crew escape technologies for the 1990's
N84-29944

EJECTORS
Thrust augmentation study of high performance ejectors
[AD-A142650] N84-29856

ELASTIC BUCKLING
Formulation of stiffness matrices for elastic buckling of thin-walled open section prismatic columns
[TT-8402] N84-30353

ELASTIC DEFORMATION
Elastic-plastic deformation of pulse-loaded structures
[AD-A142350] N84-30339

ELASTIC PLATES
Strains in an elastic plate containing an interference-fit bolt near a free edge
[AR-003-012] N84-30333

ELASTIC PROPERTIES
Design considerations for shear links in eccentrically braced frames
[PB84-192186] N84-30136
Methods for analysis of cracks in three-dimensional solids
[NASA-TM-86266] N84-30330
Strains in an elastic plate containing an interference-fit bolt near a free edge
[AR-003-012] N84-30333

ELASTIC SCATTERING
Pion elastic and inelastic scattering from (40) (42) (44) (48)Ca and (54)Fe
[DE84-009060] N84-30927

ELASTIC WAVES
Elastic domain wall waves in ferroelectric ceramics and single crystals
[AD-A142393] N84-31011

ELASTOMERS
Nonlinear structural characterization of solid propellants N84-29951
Kevlar-49/epoxy case skirt structural fatigue strength
N84-29955
High energy binders
[AD-A142347] N84-30105

ELECTRIC ARCS
Some considerations on silicone oil in high-current and energy-disconnecting mechanisms
[DE84-011021] N84-30203
Electric arc saw apparatus
[DE84-006153] N84-30306

ELECTRIC AUTOMOBILES
Evaluation of 96V exide EPV23-3 battery pack at temperature extremes
[PB84-187749] N84-30218
TVA and the electric vehicle
[DE84-900907] N84-31065

ELECTRIC BATTERIES
Advanced battery development in the US
[DE84-010505] N84-30190
Effect of charging methods on battery electrodes
[DE84-010287] N84-30196
Transport properties of concentrated solutions
[DE84-008495] N84-30210
Evaluation of 96V exide EPV23-3 battery pack at temperature extremes
[PB84-187749] N84-30218
Battery Energy Storage Test (BEST) facility
[DE84-012127] N84-30548

ELECTRIC CHARGE
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery
[PB84-184894] N84-30550

ELECTRIC CONDUCTORS
Ceramic to metal attachment system — magnetohydrodynamic generators
[DE84-011095] N84-30085

ELECTRIC CONNECTORS
Modeling and extraction of interconnect parameters in very-large-scale integrated circuits
[AD-A142361] N84-30182

ELECTRIC CONTACTS
Two algorithms for the contact problem in elastostatics, 1982
[PB83-147678] N84-30793

ELECTRIC CURRENT
Excitation of quasi-static magnetic fields in axial structures N84-30873
Measurement techniques for high-power semiconductor materials and devices
[DE84-010425] N84-31016

ELECTRIC DIPOLES
Rare-earth ion-host lattice interactions: 15. Analysis of the spectra of Nd3+ in Gd3Sc2Ga3O12
[AD-A142555] N84-31015

ELECTRIC DISCHARGES
Diagnostics of a high current capillary discharge
[DE84-011369] N84-30194
Electron emitting filaments for electron discharge devices
[DE84-011096] N84-30201
Some considerations on silicone oil in high-current and energy-disconnecting mechanisms
[DE84-011021] N84-30203
Negative ion formation in SF6 spark by-products
[DE84-012340] N84-30212
EValuation of a 96V EV 1000 battery pack at temperature extremes
[PB84-187723] N84-30217
Evaluation of an 96V ALCO 2200 battery pack at temperature extremes
[PB84-187731] N84-30219
Inductively stabilized, long pulse duration transverse discharge apparatus
[DE84-011301] N84-30261
Inductively stabilized excimer lasers
[DE84-011371] N84-30284
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery
[PB84-184894] N84-30550

ELECTRIC FIELDS
Propagation loss in electrostatically variable SAW delay lines
[AD-A142433] N84-30183
Meteorological research and support for the MIZEX (Marginal Ice Zone Experiment) program
[AD-A142409] N84-30598
Impact of weak electric field on photoconductivity of modified vitreous As2Se3 N84-30867
RFQ radial matching sections and fringe fields
[DE84-011408] N84-30920
High-gradient, pulsed operation of superconducting niobium cavities
[DE84-012498] N84-31030

ELECTRIC FURNACES
Tantalum-copper alloy and method for making
[DE84-011061] N84-30037

ELECTRIC MOTOR VEHICLES
Advanced battery development in the US
[DE84-010505] N84-30190
Battery test results on Gould GC2-EV200
[DE84-900635] N84-30208

ELECTRIC MOTORS
Compressed air systems: A guidebook on energy and cost savings
[DE84-008602] N84-30133

ELECTRIC POTENTIAL
Potential-determining reactions during pitting corrosion of aluminum
[DE84-007695] N84-30031
Intergranular failures of Alloy 600 in high temperature caustic environments
[DE84-010890] N84-30032
Klystron voltage pulse timing experiment
[DE84-011753] N84-30176
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery
[PB84-184894] N84-30550
Thermoacoustic couple
[DE84-011296] N84-30895

ELECTRIC POWER
Requirements for high-temperature air-cooled central receivers
[DE84-000081] N84-30534

ELECTRIC POWER PLANTS
Economics of a conceptual 75 MW hot dry rock geothermal electric power station
[DE83-015926] N84-30539
ELECTRIC POWER TRANSMISSION
Nuclear electromagnetic pulse (EMP) and electric power systems
[DE84-010665] N84-30166
ELECTRIC PROPULSION
Thrust balance efficiency measurements for a pulsed inductive thruster N84-29930
ELECTRIC PULSES
Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922
ELECTRICAL INSULATION
Ceramics for fusion devices
[DE84-011409] N84-30062
Negative ion formation in SF6 spark by-products
[DE84-012340] N84-30212
ELECTRICAL PROPERTIES
Surface-enhanced Raman spectroscopy of electrochemically characterized interfaces. Transition-metal isothiocyanate adsorbates at silver adsorbates
[AD-A142407] N84-29986
Diffusion and electrical properties of sulfur implanted in gallium arsenide
[AD-A142405] N84-31012
ELECTRICAL RESISTIVITY
Alkali-free phosphate glasses for high temperature, high electrical resistivity applications
[DE84-011533] N84-30091
Electron-microscopic microstructural examination of glassy Ge-Se semiconductors N84-30871
ELECTRICITY
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
ELECTRO-OPTICS
Electro-optical transmission and liquid water content of fogs and clouds
[AD-A142294] N84-30597
Diffusion and electrical properties of sulfur implanted in gallium arsenide
[AD-A142405] N84-31012
ELECTROCATALYSTS
Steam reforming of fuel to hydrogen in fuel cell
[DE84-011115] N84-30205
ELECTROCHEMICAL CORROSION
Corrosion of 5083 aluminum by aqueous sodium sulfate
[DE84-012033] N84-30045
Galvanic corrosion of an aluminum O-ring
[DE84-011345] N84-30047
The photoelectrochemistry of conducting polymers
[DE84-010869] N84-30093
ELECTROCHEMICAL OXIDATION
Effects of H2S on molten carbonate fuel cells
[DE84-010465] N84-30531
ELECTROCHEMISTRY
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985
Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions
[AD-A142403] N84-29990
Application of electrochemical and mechanical impedance measurements to corrosion induced failures
[AD-A142468] N84-30021
Electrochemistry Research Needs for Mineral and Primary Materials Processing: Report of Workshop
[PB84-192905] N84-30062
ELECTROCHROMISM
Electrochromic materials for the regulation of solar energy transmission through windows
[DE84-012165] N84-31029
ELECTRODEPOSITION
Cadmium plating versus other coatings to prevent corrosion
[AD-A142504] N84-30022
ELECTRODES
Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaamminеosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands
[AD-A142418] N84-29987
The reliability of standard rate constants for rapid electrochemical reactions
[AD-A142445] N84-29989
Photoelectrochemistry at iron oxide electrodes
[DE84-011453] N84-30003
Secondary alkaline batteries
[DE84-010963] N84-30191
Effect of charging methods on battery electrodes
[DE84-010287] N84-30196
Development of a lightweight nickel electrode
[NASA-TM-83739] N84-30528
ELECTROFORMING
Study of high performance alloy electroforming
[NASA-CR-173828] N84-30013
ELECTROLESS DEPOSITION
Development of a lightweight nickel electrode
[NASA-TM-83739] N84-30528
ELECTROLYSIS
Photovoltaic-electrolyzer system transient simulation results
[DE84-010217] N84-29995
Engineering scoping study of the production of hydrogen and oxygen from the cerium oxide-sodium phosphate/carbonate thermochemical cycle
[DE84-010629] N84-29998
Chemical-hydrogen energy systems
[DE84-012676] N84-30112
ELECTROLYTES
Rapid electrolyte exchange procedures for 22 AH nickel-cadmium celgard cells
[AD-A142004] N84-30178
Battery test results on Gould GC2-EV200
[DE84-900635] N84-30208
Transport properties of concentrated solutions
[DE84-008495] N84-30210
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery
[PB84-184894] N84-30550
ELECTROMAGNETIC ABSORPTION
Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884
ELECTROMAGNETIC FIELDS
Nuclear electromagnetic pulse (EMP) and electric power systems
[DE84-010665] N84-30166
Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
ELECTROMAGNETIC INTERACTIONS
The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas
[IPPJ-676] N84-30984
ELECTROMAGNETIC PROPULSION
Optimization of electromagnetic propulsion systems N84-29929
ELECTROMAGNETIC PULSES
Nuclear electromagnetic pulse (EMP) and electric power systems
[DE84-010665] N84-30166
ELECTROMAGNETIC SCATTERING
Inverse scattering problem
[AD-A142634] N84-30894
ELECTROMAGNETS
Dual aperture dipole magnet with second harmonic component
[DE84-011305] N84-30858
ELECTRON ACCELERATION
Computer simulation of the Lasertron
[DE84-012242] N84-30287
Plasma simulation studies of electron acceleration for beat wave and single frequency-laser heating schemes
[DE84-009988] N84-30992
ELECTRON ACCELERATORS
Exploration of phase stability in the surfatron accelerator
[DE84-011416] N84-30280
Elementary principles of linear accelerators
[DE84-007911] N84-30913
ELECTRON BEAMS
Self-propagating high-temperature synthesis of ceramics in vacuum
[AD-A142506] N84-30079
Analytic solution for the problem of gridded gap-electron flow interaction
[DE84-008975] N84-30209
Free electron lasers and related topics
[DE84-011332] N84-30277
Electron beam diagnostic for the Los Alamos free electron laser oscillator experiment
[DE84-011348] N84-30278
The XUV/VUV free-electron laser oscillator
[DE84-011347] N84-30279
Exploration of phase stability in the surfatron accelerator
[DE84-011416] N84-30280
A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30568
Making electron beams for SLC linac
[DE84-012072] N84-30907
Observed current enhancement with propagation of the ETA electron beam in air
[DE84-010558] N84-30909
Electron motion in solenoidal magnetic fields using a first order symplectric integration algorithm
[DE84-011341] N84-30910
Temperature rise calculations for the beam pipe in the SLC arcs
[DE84-011764] N84-30924
Modeling the interaction of high power ion or electron beams with solid target materials
[DE84-009126] N84-30931
Simulation of ultra-low emittance electron storage rings
[DE84-012050] N84-31024
ELECTRON BUNCHING
Computer simulation of the Lasertron
[DE84-012242] N84-30287
Making electron beams for SLC linac
[DE84-012072] N84-30907
ELECTRON COUNTERS
Feasibility studies of Conversion Electron Moessbauer Spectroscopy (CEMS) of iron-doped InP
[AD-A142463] N84-31014
ELECTRON CYCLOTRON HEATING
Density variation due to wave heating in Tokamak plasmas
[DE84-009402] N84-30993
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas
[DE84-012396] N84-31002
ELECTRON DENSITY (CONCENTRATION)
Study of stimulated Brillouin and Raman scattering
[DE84-011260] N84-30286
Nonlocal heat transport by non-Maxwellian electrons
[DE84-012391] N84-31000
ELECTRON DISTRIBUTION
Electron velocity distributions near collisionless shocks
[DE84-011352] N84-30235
Nonlocal heat transport by non-Maxwellian electrons
[DE84-012391] N84-31000
ELECTRON EMISSION
Electron emitting filaments for electron discharge devices
[DE84-011098] N84-30201
ELECTRON ENERGY
Investigation of laminar shocks
[DE84-010074] N84-30582
ELECTRON GAS
Fractional quantization of the Hall effect
[DE84-008894] N84-31023
ELECTRON MASS
Calculation of molecular final states and their effect on a precision neutrino mass experiment
[DE84-011071] N84-30921
ELECTRON MICROSCOPY
Corrosion of 5083 aluminum by aqueous sodium sulfate
[DE84-012033] N84-30045
Application of transverse-section analytical electron microscopy to the study of oxidation of metal alloys
[DE84-006415] N84-30049
The role of sintering in the oxidation-reduction of palladium powders
[DE84-011202] N84-30059
Low temperature sintering of Al2O-CaO
[DE84-010713] N84-30083
High resolution electron microscopy studies of the early stages of decomposition in alloys and ceramics
[DE84-020802] N84-30087
Electron-microscopic microstructural examination of glassy Ge-Se semiconductors N84-30871
Karnovsky-osmium as a primary fixative for electron microscopy
[AD-A142671] N84-30957
ELECTRON PRECIPITATION
A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30568
ELECTRON SPECTROSCOPY
Feasibility studies of Conversion Electron Moessbauer Spectroscopy (CEMS) of iron-doped InP
[AD-A142463] N84-31014
ELECTRON TRAJECTORIES
Orbital stability in combined uniform axial and three-dimensional wiggler magnetic fields for free-electron lasers
[NASA-TM-83753] N84-30273
ELECTRON TRANSFER
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985

Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaamminеosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands
[AD-A142418] N84-29987
Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions
[AD-A142483] N84-29990

ELECTRON TUNNELING
The transfer of atoms, ions and molecular groups in solution. Part 2: Tunnelling between harmonic wells
[AD-A142334] N84-29982

ELECTRONIC CONTROL
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29879

ELECTRONIC EQUIPMENT
Computer graphics enhancement for COMEL (communications electronics)
[AD-A141920] N84-30741
Improving system affordability
[AD-A142387] N84-31062

ELECTRONIC MODULES
MMIC technology for advanced space communications systems
[NASA-TM-83749] N84-30147

ELECTRONS
Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900

ELECTROPLATING
Electrochemistry Research Needs for Mineral and Primary Materials Processing: Report of Workshop
[PB84-192905] N84-30062

ELECTROSTATICS
Electrostatic filtration of N2O4 for removal of solid and vapor contaminants N84-29922
Two algorithms for the contact problem in elastostatics, 1982
[PB83-147678] N84-30793

ELEMENTARY PARTICLE INTERACTIONS
Flavor mixing and the six quark model
[USIP-84-06] N84-30940
Activities in nuclear and high energy physics
[B8467321] N84-30949

ELEMENTARY PARTICLES
Research program in elementary particle theory
[DE84-011502] N84-30933

ELEVATION
Water resources data for Arkansas, water year 1982
[PB84-181296] N84-30522

ELEVATORS (LIFTS)
Eyebolts for lift suspension
[NPL-DMA(A)70] N84-30292

ELIMINATION
Human stomach motor and evacuatory functions during antiorthostatic hypokinesia N84-30649

ELLIPTIC DIFFERENTIAL EQUATIONS
Elliptic grid generation for three-dimensional geometries N84-30117
Optimization of a numerical method to calculate elliptic flows
[DFVLR-FB-84-16] N84-30252
Modified 5-point and 9-point schemes for the solution of the Vorticity- transport equation with cross derivatives
[AD-A142720] N84-30851

ELLIPTICAL CYLINDERS
Numerical simulation of autorotation N84-30118

ELONGATION
Environmental assisted fracture of cast and wrought steels in brine
[DE84-011870] N84-30058

EMBEDDING
Ada (trademark) for business and other non-DOD applications
[AD-P003425] N84-30757

EMBRITTLEMENT
Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests
[DE84-012833] N84-30054
Neutron embrittlement of the reactor vessel in Borssele as determined from Charpy specimens
[S/T-REPT-VOL-1-NO-4] N84-30352

EMERGENCIES
Third World Congress on Emergency and Disaster Medicine
[FOA-C-52005-H4] N84-30692

EMERGENCY LIFE SUSTAINING SYSTEMS
Cabin air quality
[GPO-29-522] N84-30702

EMISSION
Studies of X-ray clusters of galaxies/intergalactic plasmas
[NASA-CR-173825] N84-31068

ENERGETIC PARTICLES
The galactic acceleration of ultrahigh energy cosmic rays
[DE84-012442] N84-31080

ENERGY ABSORPTION
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868
Impact dynamics research on composite transport structures N84-29975
Shock wave absorber having apertured plate
[DE84-011271] N84-30345
Non-geometrical optics investigation of mode conversion in weekly relativistic inhomogeneous plasmas
[DE84-012396] N84-31002

ENERGY CONSERVATION
Compressed air systems: A guidebook on energy and cost savings
[DE84-008802] N84-30133
Energy conservative cable system demonstration project
[DE84-008982] N84-30195
Stability criterion for moist compressible atmosphere and energy conditions for development of convective cloud cover: Numerical experiment N84-30489
Modification of the surface temperature by an artificial cirrus cloud
[DE84-011387] N84-30811

ENERGY CONSUMPTION
Research and development of energy-efficient high back-pressure compressor
[DE84-011827] N84-30131
Energy conservative cable system demonstration project
[DE84-008982] N84-30195

ENERGY CONVERSION
German-Argentinian R and D project for the utilization of wind energy
[BMFT-FB-T-84-080] N84-30549

ENERGY CONVERSION EFFICIENCY
Energy conservative cable system demonstration project
[DE84-008982] N84-30195
Theoretcial studies of solar-pumped lasers
[NASA-CR-173833] N84-30274
Comparison of methods for calculating energy release rates
[DE84-012231] N84-30350
Photo/Biological Hydrogen Principal Investigators Review Meeting: Proceedings of the May 1983 Program Review
[DE84-000083] N84-30536
Proceedings of the DOE Physical and Chemical Energy Storage Annual Contractors' Review Meeting
[DE83-017536] N84-30540

ENERGY DISSIPATION
Design considerations for shear links in eccentrically braced frames
[PB84-192186] N84-30136
Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

ENERGY DISTRIBUTION
Worldwide energy resource distribution estimates
[DE84-012216] N84-30612

ENERGY LEVELS
Rare-earth ion-host lattice interactions: 15. Analysis of the spectra of Nd3+ in Gd3Sc2Ga3O12
[AD-A142555] N84-31015

ENERGY OF FORMATION
Comparison of methods for calculating energy release rates
[DE84-012231] N84-30350

ENERGY POLICY
Engineering research on positive displacement gas expanders, phase 1
[DE84-008977] N84-30310
Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys
[DE84-012547] N84-30519
Appropriate Technology Small Grants Program evaluation, volume 1: Executive summary
[DE84-010675] N84-31038
Appropriate Technology Small Grants Program evaluation, volume 2
[DE84-010674] N84-31039

ENERGY SOURCES
Worldwide energy resource distribution estimates
[DE84-012216] N84-30612

ENERGY SPECTRA
Electron beam diagnostic for the Los Alamos free electron laser oscillator experiment
[DE84-011348] N84-30278
Dynamics of plasma corona on spherical targets irradiated by laser N84-30878

ENERGY STORAGE
New 1-phase dual converter for superconducting inductive energy storage and transfer applications: The 1-phase inductor-converter bridge
[DE84-012118] N84-30193
Economics of a conceptual 75 MW hot dry rock geothermal electric power station
[DE83-015926] N84-30539
Proceedings of the DOE Physical and Chemical Energy Storage Annual Contractors' Review Meeting
[DE83-017536] N84-30540
Battery Energy Storage Test (BEST) facility
[DE84-012127] N84-30548
Commissioning tests of the Bonneville Power Administration 30 MJ superconducting magnetic energy storage unit
[DE84-006033] N84-30860

ENERGY TECHNOLOGY
Chemical-hydrogen energy systems
[DE84-012876] N84-30112
Photo/Biological Hydrogen Principal Investigators Review Meeting: Proceedings of the May 1983 Program Review
[DE84-000083] N84-30536
Proceedings of the DOE Physical and Chemical Energy Storage Annual Contractors' Review Meeting
[DE83-017536] N84-30540
Ocean Energy Technology Program
[DE84-012052] N84-30542
Environmental effects of increasing the amount of district heating in the Netherlands
[S/T-REPT-VOL-1-NO-5] N84-30558
Appropriate Technology Small Grants Program evaluation, volume 1: Executive summary
[DE84-010675] N84-31038
Appropriate Technology Small Grants Program evaluation, volume 2
[DE84-010674] N84-31039
Information Center Complex publications and presentations, 1971-1982
[DE84-010603] N84-31055

ENERGY TRANSFER
Performance verification tests of an uprated augmented catalytic thruster N84-29911
Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994
Energy release and fluid dynamics in multiphase systems
[AD-A142402] N84-30228
Global hydrologic cycle N84-30434
Biological oceanography N84-30437
Temperature rise calculations for the beam pipe in the SLC arcs
[DE84-011764] N84-30924

ENGINE DESIGN
SSME modifications for on-demand launch vehicles
N84-29914
Evolution and flight history of the Defense Meteorological Satellite Program (DMSP) propulsion module N84-29917
Firebolt derivative/ramjet engine feasibility investigation (core engine program): Program summary N84-29962
Utilization of SRC-2 fuel in an insulated diesel engine
[DE84-004366] N84-30111

ENGINE INLETS
Instrumentation for in-flight acoustic measurements in an engine intake
[NLR-MP-83060-U] N84-30898

ENGINE MONITORING INSTRUMENTS
Instrumentation for in-flight acoustic measurements in an engine intake
[NLR-MP-83060-U] N84-30898

ENGINE NOISE
Scope for active noise abatement in vehicle diesel engines
[BLL-M-28767-(5825.4)] N84-30865

ENGINE PARTS
Techniques for fatigue life predictions from measured strains
[NASA-CR-171118] N84-30334

ENGINE TESTING LABORATORIES
Aerodynamic and Propulsion Test Unit (APTU) performance with a vitiated air heater N84-29964

ENGINE TESTS
SSME modifications for on-demand launch vehicles
N84-29914
Shuttle payload improvement by low risk modifications to the OMS engine N84-29925

Firebolt derivative/ramjet engine feasibility investigation (core engine program): Program summary N84-29962

ENTROPY
Solvent, ligand, and ionic charge effects on reaction entropies for simple transition-metal redox couples
[AD-A142374] N84-29984

ENVIRONMENT EFFECTS
Environmental effects of increasing the amount of district heating in the Netherlands
[S/T-REPT-VOL-1-NO-5] N84-30558
Air pollution effects on aquatic ecosystems: Summary of a symposium
[PB84-185214] N84-30562
Identification and preliminary characterization of global water resource issues which may be affected by CO2-induced climate change
[DE84-011127] N84-30604

ENVIRONMENT SIMULATION
Evolution of structure in the PLACES barium clouds
[DE84-010996] N84-30583

ENVIRONMENTAL ENGINEERING
Daylight availability as a function of atmospheric conditions
[DE84-007973] N84-30609

ENVIRONMENTAL LABORATORIES
European Space Tribology Laboratory: Facilities, services, capabilities
[ESA-BR-12] N84-30317

ENVIRONMENTS
Environmental assisted fracture of cast and wrought steels in brine
[DE84-011670] N84-30058

ENZYME ACTIVITY
Use of sperm enzymes to detect genotoxic agents
[AD-A142724] N84-30691

ENZYMES
Use of sperm enzymes to detect genotoxic agents
[AD-A142724] N84-30691

EPINEPHRINE
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682

EPITAXY
Experimental studies of laterally seeded recrystallized polysilicon on silicon dioxide
[AD-A142382] N84-30077

EPOXY MATRIX COMPOSITES
Residual curing stress of carbon-resin composites
[ONERA-RT-6/3521-M] N84-29960

EPOXY RESINS
Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954

EQUIPMENT SPECIFICATIONS
Eyebolts for lift suspension
[NPL-DMA(A)70] N84-30292

ERGOTAMINE
Effect of dihydroergotamine on human circulation during orthostatic tests N84-30646

EROSION
The use of isotopically-enriched carbon probes for erosion deposition measurements in the ASDEX divertor
[DE84-012329] N84-31006

ERROR ANALYSIS
Grid-size reduction in flow calculations on infinite domains by higher-order far-field asymptotics in numerical boundary conditions
[NLR-MP-83029-U] N84-30253
TM failed detectors data replacement N84-30382
Assessment of Thematic Mapper band-to-band registration by the block correlation method N84-30396
Sensitivity of SLR baselines to errors in Earth orientation N84-30461
The ERODYN and QRPIG computer programs N84-30468
Data integrity factors affecting the construction of the mapping, charting, and geodesy data base
[NASA-CR-173635] N84-30511
Bias removal for conventional magnetotelluric data
[DE84-012189] N84-30579
Instrumentation for in-flight acoustic measurements in an engine intake
[NLR-MP-83060-U] N84-30898

ERROR SIGNALS
On fixed-interval minimum symbol error probability detection
[AD-A142465] N84-30649

ERRORS
A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems
[AD-A141136] N84-29898

ERYTHROCYTES
Dynamics of red blood cell changes in rats during acute immobilization N84-30651
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682

ESA SPACECRAFT
The evaluation and approval of automatic machine wave soldering for ESA spacecraft hardware
[ESA-PSS-01-707] N84-30215

ESCAPE ROCKETS
History of aircraft escape system propulsion N84-29941
Propulsion in a life-saving role for ACES 2 N84-29942
The Stencel S4S ejection seat: A study in new pyrotechnic developments N84-29943

ESCAPE SYSTEMS
History of aircraft escape system propulsion N84-29941
Propulsion in a life-saving role for ACES 2 N84-29942
The Stencel S4S ejection seat: A study in new pyrotechnic developments N84-29943
Crest: Crew escape technologies for the 1990's N84-29944
Energy management for crew escape systems N84-29945

ESTERS
Synthesis of diazidodiesters N84-29956

ESTIMATES
Decentralized estimation in communication networks with delay
[AD-A142376] N84-30155

ESTIMATING
A high-resolution target-tracking concept using spectral estimation techniques
[AD-A141921] N84-30149
State estimation and control of conditionally linear systems
[AD-A142455] N84-30826

ESTUARIES
Chesapeake Bay nutrient dynamics study
[PB84-190982] N84-30524

ETHERS
Nitrate ester polyether glycol prepolymers N84-29947

ETHYL ALCOHOL
Nutritional and environmental factors in ethanol fermentation by Saccharomyces cerevisiae
[DE84-009693] N84-30110

ETHYLENE
Promotion effects on the synthesis of higher alcohols
[DE84-009916] N84-30109

ETHYLENE OXIDE
Uniaxial draw of poly(ethylene oxide) by solid state extrusion
[AD-A141923] N84-30074

EULER EQUATIONS OF MOTION
Acceleration to a steady state for the Euler equations
[NASA-CR-172398] N84-29852

EULER-LAGRANGE EQUATION
An improved accuracy general remapping algorithm
[DE84-004320] N84-30837

EUROPE
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512

EUROPEAN SPACE AGENCY
Status of the ESA-Earthnet LANDSAT-4 TM ground processing chain N84-30391

EUROPEAN SPACE PROGRAMS
Space research in Belgium, 1982-1983 N84-31084

EUTECTIC COMPOSITES
Influences of directionally solidified techniques and hafnium content on a nickel base high temperature alloy N84-30064

EVALUATION
Salyut: Soviet steps toward permanent human presence in space
[PB84-181437] N84-29905
Current research in parallel microprocessing systems at Los Alamos
[DE84-011342] N84-30604

EVAPORATION
The evaporation and gaseous dispersion of large-scale releases of nitrogen tetroxide
[AD-A142079] N84-30104

EVAPOTRANSPIRATION
Global hydrologic cycle N84-30434

EXCHANGING
Rapid electrolyte exchange procedures for 22 AH nickel-cadmium celgard cells
[AD-A142004] N84-30178
Global Biology Research Program: Biogeochemical Processes in Wetlands
[NASA-CP-2316] N84-30665
Geographic distribution of wetland parameters: The foundation of a data base N84-30667

EXCIMER LASERS
Inductively stabilized, long pulse duration transverse discharge apparatus
[DE84-011301] N84-30281
Inductively stabilized excimer lasers
[DE84-011371] N84-30284
Efficient forward conversion in a Raman generator
[DE84-007466] N84-30285

EXCITATION
Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994
Kinetic processes in high pressure gases. Excited state collisions
[AD-A141927] N84-30016
A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30568
Excitation of quasi-static magnetic fields in axial structures N84-30873
Introduction to neutron scattering by magnetic excitations
[DE84-008579] N84-30904

EXCITONS
Theory of the electronic structure and optical properties of organic solids: Exciton effects
[AD-A142544] N84-29983
Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884

EXERCISE PHYSIOLOGY
Exchange of gases and physical work capacity in natives of different geographic regions N84-30656

EXHAUST EMISSION
Utilization of SRC-2 fuel in an insulated diesel engine
[DE84-004386] N84-30111
Anti-tampering and anti-misfueling programs to reduce in-use emissions from motor vehicles
[PB84-185222] N84-30559

EXOBIOLOGY
NASA space biology accomplishments, 1983-84
[NASA-TM-86654] N84-30664
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 261)
[NASA-SP-7011(261)] N84-30683

EXPANSION
Numerical and analytical studies of steady detonation waves with expansion losses
[AD-A142601] N84-30232

EXPERT SYSTEMS
Interaction of human cognitive models and computer-based models in supervisory control
[AD-A142677] N84-30717

EXPLOSIONS
Explosion parameters of ferroalloy dusts
[BLL-M-35571-(5828.4)] N84-30102
Some considerations on silicone oil in high-current and energy-disconnecting mechanisms
[DE84-011021] N84-30203

EXPLOSIVE FORMING
Analysis of localized microstructural changes in dynamically consolidated metal powders
[DE84-006298] N84-30026
Mechanical properties of a shock consolidated steel powder
[DE84-003573] N84-30056
High performance Extrusion Cast Explosives (ECK)
[DE84-006244] N84-30107

EXPLOSIVES
High performance Extrusion Cast Explosives (ECK)
[DE84-008244] N84-30107

EXPONENTIAL FUNCTIONS
Spectral and invertibility properties of band matrices
[AD-A142637] N84-30831
Stabilization studies
[AD-A142644] N84-30832

EXPOSURE
Sampling report for the study of personal CO (carbon monoxide) exposure
[PB84-181957] N84-30560

EXTRAPOLATION
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157
An objective analysis technique for extrapolating tidal fields N84-30471

EXTREMELY HIGH FREQUENCIES
Backscatter measurements on snow covered terrain at 94 GHz — radar
[REPT-4-84] N84-30144

EXTRUDING
Analysis of fracture modes during extrusion and drawing of bimetal rods or wire
[DE84-009849] N84-30051

Uniaxial draw of poly(ethylene oxide) by solid state extrusion
[AD-A141923] N84-30074
EYE (ANATOMY)
Guidelines for running the thermal computational model of the eye
[AD-A142550] N84-30688

F

F REGION
High-latitude ionospheric irregularities
[AD-A142648] N84-30573
F-8 AIRCRAFT
Flight investigation of various control inputs intended for parameter estimation
[NASA-TM-85901] N84-29684
F-15 AIRCRAFT
F-15 AN/APG-63 radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142071] N84-29673
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29679
F-16 AIRCRAFT
F-16 APG-66 fire control radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142075] N84-29674
FABRICATION
Experimental study of the naphtaline heat pipe
N84-30125
Dynamic powder compaction
[DE84-006133] N84-30132
Photovoltaic concentrators: Present status and future role
[DE84-005520] N84-30532
Low cost, sprayed CuInSe2 solar cell research
[DE84-010480] N84-30533
Diffusion and electrical properties of sulfur implanted in gallium arsenide
[AD-A142405] N84-31012
FACTORIAL DESIGN
The effect of spatial, spectral and radiometric factors on classification accuracy using thematic mapper data
[NASA-TM-85995] N84-30510
FACULAE
The NOAA-ERL-ARL solar UV radiation and climate research project program description
[PB84-183292] N84-31070
FAILURE
Intergranular failures of Alloy 600 in high temperature caustic environments
[DE84-010890] N84-30032
Operator performance on flat-panel displays with line and cell failures
[AD-A142340] N84-30716
FAILURE ANALYSIS
Mechanisms of intergranular failures in Alloy 600 in high temperature environments
[DE84-010514] N84-30033
Inference based on ranks with multiple failure time or grouped survival data
[MATHS-RES-177] N84-30324
Fault management N84-30709
FAILURE MODES
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970
FAR INFRARED RADIATION
Detection of NH-2O-radicals by far-infrared laser magnetic resonance spectroscopy
[MPIS-6/1984] N84-30010
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069
FAR ULTRAVIOLET RADIATION
The XUV/VUV free-electron laser oscillator
[DE84-011347] N84-30279
FARADAY EFFECT
Graphite-ceramic RF Faraday-thermal shield and plasma limiter
[DE84-010960] N84-30066
FARMLANDS
Preliminary evaluation of TM for soils information
N84-30427
FAST FOURIER TRANSFORMATIONS
Spectral methods for compressible flow problems
[NASA-CR-172395] N84-30816
FATIGUE (MATERIALS)
Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954
Fatigue behavior of long and short cracks in wrought and powder aluminum alloys
[AD-A142609] N84-30024
Aeronautical Materials (selected articles)
[AD-A139952] N84-30063
Influence of temperature on the Delta K sub th and da/dN of LY-12CS aluminum alloy N84-30067
Preliminary investigation of fatigue crack propagation of 30CrMnSiA steel in salt spray corrosion conditions
N84-30068
The effects of non-metallic inclusions in steel on fatigue properties N84-30070
Characteristics of initial period fatigue crack propagation of metals and its affecting factors N84-30071
Near-threshold fatigue crack propagation: A perspective on the role of crack closure
[DE84-009669] N84-30202
Fatigue and Fracture Branch: A compendium of recently completed and on-going research projects
[NASA-TM-85825] N84-30331
A new optical technique for rapid determination of creep and fatigue thresholds at high temperature
[AD-A142675] N84-30341
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
FATIGUE LIFE
Durability methods development, volume 7
[AD-A142400] N84-29665
A tractable theory for nonlinear propellant response and cumulative damage predictions N84-29950
A study of stiffness, residual strength and fatigue life relationships for composite laminates
[NASA-CR-172211] N84-29978
Techniques for fatigue life predictions from measured strains
[NASA-CR-171118] N84-30334
FATIGUE TESTS
Durability methods development, volume 7
[AD-A142400] N84-29665
FAULT TOLERANCE
A summary of fault tolerant computing research at Carnegie Mellon University
[AD-A142707] N84-30777
Characterization of real-time computers
[NASA-CR-3807] N84-30801
FEASIBILITY ANALYSIS
Is the wind a practical source of energy for you?
[DE84-010938] N84-30541
On-site analysis to assess the feasibility of wind power
[DE84-009762] N84-30806
Design issues in parallel architectures for artificial intelligence
[AD-A142482] N84-30809
New lasing ferroelectric material Pb5Ge3O11-Nd-3(+)
N84-30875
High-Q open resonator structures with sparse spectrum N84-30876
FEDERAL BUDGETS
Report of accomplishments under the airport improvement program
[AD-A142444] N84-29889
Federal funds for research and development, fiscal years 1981, 1982 and 1983, volume 31
[PB84-189596] N84-31045
Federal funds for research and development, fiscal years 1982, 1983 and 1984. Volume 32: Detailed statistical tables
[PB84-189604] N84-31046
FEEDBACK
Summaries of doctorate theses — man machine systems N84-30705
Proprioception — prosthetic devices N84-30714
FEEDBACK CONTROL
Approximation techniques for parameter estimation and feedback control for distributed models of large flexible structures
[NASA-CR-172411] N84-29903
Stability of tubes conveying fluid
[DE84-010573] N84-30240
Summaries of doctorate theses — man machine systems N84-30705
FEMUR
Ultrasonography of canine soft tissues during decompression N84-30653
FERMENTATION
Nutritional and environmental factors in ethanol fermentation by Saccharomyces cerevisiae
[DE84-009693] N84-30110
FERMIONS
Staggered fermions and rotation-gauge invariance
[PREPRINT-357] N84-30937
Some negative results for avoiding lattice fermionic doubling
[PREPRINT-358] N84-30938
FERRITES
Directional growth of pearlite in Fe-C eutectiod alloys
[DE84-007366] N84-30042
A study of distributed millimeter-wave isolators
[AD-A142729] N84-30169
FERRITIC STAINLESS STEELS
Sulfidation- and oxidation-resistant ferritic stainless steel containing aluminum
[PB84-189521] N84-30101
FERROELECTRICITY
New lasing ferroelectric material Pb5Ge3O11-Nd-3(+)
N84-30875
FERROFLUIDS
Dual rotating shaft seal apparatus
[DE84-011101] N84-30307
FERROMAGNETIC MATERIALS
Introduction to neutron scattering by magnetic excitations
[DE84-006579] N84-30904
FERROMAGNETIC RESONANCE
Detection of NH-2O-radicals by far-infrared laser magnetic resonance spectroscopy
[MPIS-6/1984] N84-30010
FERROMAGNETISM
Monte Carlo simulation of the microcanonical ensemble
[DE84-010880] N84-30923
FIBER OPTICS
Phase conjugate optics
[AD-A141960] N84-30951
Omnidirectional fiber optic tiltmeter
[DE84-011109] N84-30959
Two novel plasma diagnostics — single mode optical fiber sensors and phase conjugation in nonlinear optics
[DE84-009970] N84-30990
FIBER REINFORCED COMPOSITES
Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972
FIBROBLASTS
Karnovsky-osmium as a primary fixative for electron microscopy
[AD-A142671] N84-30957
FIELD EFFECT TRANSISTORS
The 8th European Specialist Workshop on Active Microwave Semiconductor Devices 4-6 may 1983
[AD-A142252] N84-30180
Large-signal characterization of nonlinear two-port active networks
[AD-A142462] N84-30184
Strained layer superlattice materials for millimeter wave FET's, phase 1
[DE84-011475] N84-31007
Transient response of GaAs microwave power FET to X-ray pulses
[DE84-010145] N84-31017
FIELD THEORY (PHYSICS)
Research program in elementary particle theory
[DE84-011502] N84-30933
High energy nuclear structures
[DE84-010062] N84-30947
Fun with supersymmetric quantum mechanics
[DE84-011329] N84-31031
FILAMENT WINDING
Characterization of filament wound Kevlar and glass composites for rocket motor applications N84-29949
Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954
FILE MAINTENANCE (COMPUTERS)
Weapons file
[AD-A142506] N84-29667
Report on functional design specification for the automated alphanumeric data entry system
[AD-A142518] N84-30725
Argonne integrated heterogeneous file transfer network
[DE84-012092] N84-30603
FILMS
Impact of weak electric field on photoconductivity of modified vitreous As2Se3 N84-30667
Noncubic magnetic anisotropy in YSmLuCaFeGe garnet films N84-30669
FILTERS
The present status of Clean PAL systems
[BBC-RD-1984/6] N84-30142
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
FILTRATION
Iron nitrate and MON-3 nitrogen tetroxide N84-29909
Electrostatic filtration of N2O4 for removal of solid and vapor contaminants N84-29922

Electro-optical transmission and liquid water content of fogs and clouds [AD-A142294] N84-30597
Growth and characterization of metal oxide whiskers for aerosol filtration [DE84-011049] N84-31021

FINANCIAL MANAGEMENT
National Aeronautics and Space Administration's first-year implementation of the Federal Managers' Financial Integrity Act [PB84-186770] N84-31044

FINE STRUCTURE
Accuracy of mapping the Earth's gravity field fine structure with a spaceborne gravity gradiometer mission N84-30473

FINITE DIFFERENCE THEORY
Analysis of airfoil transitional separation bubbles [NASA-CR-3791] N84-29654
Freejets of rotationally relaxing diatomic gases N84-30119
Improved methods of vibration analysis of pretwisted, airfoil blades [NASA-TM-83735] N84-30329
Modified 5-point and 9-point schemes for the solution of the Vorticity- transport equation with cross derivatives [AD-A142720] N84-30851

FINITE ELEMENT METHOD
Hybrid modeling of soil-structure interaction in layered media [PB84-192176] N84-30137
TOPAZ: A finite element heat conduction code for analyzing 2-D solids [DE84-010676] N84-30247
Solving crack problems with analytical techniques and the finite elements method [BLL-RISLEY-TR-4940-(9091.9F)] N84-30325
Ring-type support concept for twisted coils (finite element simulation) --- stellarators [IPP-2/271] N84-30327
Methods for analysis of cracks in three-dimensional solids [NASA-TM-86266] N84-30330
Formulation of stiffness matrices for elastic buckling of thin-walled open section prismatic columns [TT-8402] N84-30353
Testament of general boundary conditions and point-wise state variable constraints in optimum design for static and dynamic response [PB84-192749] N84-30356
Computational method for thermoviscoelasticity with application to rock mechanics [DE84-003067] N84-30585
On the extremum of bilinear functional for hyperbolic type partial differential equations [AD-A142505] N84-30828
On the design of a Pipelined/Systolic finite element system [AD-A142558] N84-30830
Moving finite elements in 2-D. Technical report: Year 3 [DE84-008551] N84-30840
A finite element method for treating nearly one way wave propagation [DE84-010294] N84-30889
Finite-element-analysis of fields radiated from ICRF antenna [IPPJ-675] N84-30965

FINS
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970

FIRE CONTROL
F-16 APG-66 fire control radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study [AD-A142075] N84-29874

FIRE PREVENTION
Decision analysis model for passenger-aircraft fire safety with application to fire-blocking of seats [AD-A142477] N84-29859

FIRES
Fire induced flows through room openings - flow coefficients [PB84-176759] N84-30011
Natural convection flows and associated heat transfer processes in room fires [PB84-171172] N84-30140
Cabin air quality [GPO-29-522] N84-30702

FLAME PROPAGATION
Thin flame model for reactive flow in porous materials [DE84-011406] N84-30002
Vortex methods and turbulent combustion [DE84-011874] N84-30004

FLAMMABILITY
Definition of the concentration gradient above flammable liquids [DE84-008296] N84-29996

FLASH
Comparison of lightning flash rates from the PBE sensor and streak counting from the DMSP satellite [DE84-006722] N84-30602

FLASH LAMPS
A program to improve solar blind UV (ultraviolet) flash lamps [AD-A141909] N84-30177

FLAT PLATES
Interference drag in a simulated wing-fuselage juncture [NASA-CR-3811] N84-29653

FLAVOR (PARTICLE PHYSICS)
Flavor mixing and the six quark model [USIP-84-06] N84-30940

FLEXIBILITY
Flexure hinge [PB84-178557] N84-30319
Reliability analysis for stiff versus flexible piping [DE84-006325] N84-30344

FLEXING
SEASAT observations of lithospheric flexure N84-30463

FLIGHT CHARACTERISTICS
Flight characteristics of a manned, low-speed, controlled deep stall vehicle [NASA-TM-86041] N84-29863
Application of sensitivity analysis to aerodynamic parameters of a bank to turn missile [AD-A141940] N84-29899

FLIGHT CREWS
Crest: Crew escape technologies for the 1990's N84-29944
Energy management for crew escape systems N84-29945

FLIGHT SAFETY
Cabin air quality [GPO-29-522] N84-30702

FLIGHT SIMULATION
A method for three-dimensional modeling of wind-shear environments for flight simulator applications [NASA-TM-85969] N84-29857
Improved pilot model for application to a computer flight testing program for helicopters [NLR-MP-83052-U] N84-29869

FLIGHT SIMULATORS
A method for three-dimensional modeling of wind-shear environments for flight simulator applications [NASA-TM-85969] N84-29857

FLIGHT TESTS
Fuel savings potential of the NASA Advanced Turboprop Program [NASA-TM-83736] N84-29878
Flight investigation of various control inputs intended for parameter estimation [NASA-TM-85901] N84-29884
Simulator evaluation of a remotely piloted vehicle lateral landing task using a visual display [NASA-TM-85903] N84-29885
APL/JHU free flight tests of the general purpose heat source module. Testing: 5-7 March 1984 [DE84-011065] N84-30948

FLIR DETECTORS
Evaluation of U.S. Coast Guard forward-looking airborne radars [AD-A142417] N84-30156

FLOOD DAMAGE
Debris Flows, Landslides, and Floods in the San Francisco Bay Region, January 1982: Overview and summary of a conference [PB84-194737] N84-30590

FLOOD PREDICTIONS
Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications N84-30431

FLOODS
Debris Flows, Landslides, and Floods in the San Francisco Bay Region, January 1982: Overview and summary of a conference [PB84-194737] N84-30590

FLORIDA
Variability of the convection field pattern in South Florida and its relationship to the synoptic flow [PB84-177393] N84-30623

FLOW CHARACTERISTICS
Flow of foam through porous media [DE84-012410] N84-30246

FLOW COEFFICIENTS
Fire induced flows through room openings - flow coefficients [PB84-176759] N84-30011

FLOW DISTRIBUTION
Air Force Academy Aeronautics Digest [AD-A142399] N84-29849
Iron nitrate and MON-3 nitrogen tetroxide N84-29909
High pressure LOX/natural gas staged combustion technology N84-29927

FLOW EQUATIONS
Optimization of a numerical method to calculate elliptic flows [DFVLR-FB-84-16] N84-30252
Semi-implicit method for three-dimensional compressible MHD simulation [IPP-6/234] N84-30961

FLOW GEOMETRY
Numerical analysis of the burst in the turbulent boundary layer, based on the three-dimensional ortex model N84-30116
Elliptic grid generation for three-dimensional geometries N84-30117

FLOW GRAPHS
An algorithm for parsing flow graphs [AD-A142440] N84-30773

FLOW MEASUREMENT
Effect of turbulent boundary layer flow on measurement of acoustic pressure and intensity, revised [AD-A142473] N84-30229

FLOW STABILITY
Dual mode propulsion system engine testing for INTELSAT N84-29913
Stability criterion for moist compressible atmosphere and energy conditions for development of convective cloud cover: Numerical experiment N84-30489

FLOW VELOCITY
Electron velocity distributions near collisionless shocks [DE84-011352] N84-30235
Stability of tubes conveying fluid [DE84-010573] N84-30240
Long-term salinity, temperature and current measurements in upper Chesapeake Bay [PB84-180280] N84-30636

FLOW VISUALIZATION
Visualization for a free jet by a laser induced fluorescence method and its structure N84-30120
Flow of foam through porous media [DE84-012410] N84-30246

FLOWMETERS
Active ultrasonic cross-correlation flowmeters for mixed-phase pipe flows [DE84-006449] N84-30260

FLUID BOUNDARIES
Numerical treatment of pipe boundary conditions in two-phase flow [DE84-006553] N84-30238

FLUID DYNAMICS
Energy release and fluid dynamics in multiphase systems [AD-A142402] N84-30228
Study of ebullated bed fluid dynamics [DE84-010230] N84-30251
An improved accuracy general remapping algorithm [DE84-004320] N84-30837
USSR report: Physics and mathematics [JPRS-UPM-84-001] N84-30862

FLUID FILTERS
Electrostatic filtration of N2O4 for removal of solid and vapor contaminants N84-29922

FLUID FLOW
Purification of nitrogen tetroxide for long-term reliability N84-29920
Non-inertial flow of dilute polymer solutions in a sudden contraction [BLL-WH-558-(909A.9F)] N84-30221
Flow Induced Vibration Program at Argonne National Laboratory [DE84-009233] N84-30249
Wave uplift pressure on horizontal platforms [PB84-190628] N84-30257
Void-particulate director [DE84-011300] N84-30262
Applied mathematics of transport theory [DE84-011498] N84-30838
Experimental study on porous-plug phase separator for superfluid He2 [ISAS-612] N84-31008

FLUID MECHANICS
Two-stage process for conversion of synthesis gas to high quality transportation fuels [DE84-009624] N84-30108
INFIL1D: A quasi-analytical model for simulating one-dimensional, constant flux infiltration [DE84-008905] N84-30250
Study of ebullated bed fluid dynamics [DE84-010230] N84-30251
Applied mathematics of transport theory [DE84-011498] N84-30838

Institutional supporting research highlights in physics and mathematics, fiscal year 1983
[DE84-011025] N84-30655
FLUIDIZED BED PROCESSORS
Laboratory for Energy Related Health Research
[DE84-000529] N84-30672
FLUIDS
Thermoacoustic couple
[DE84-011296] N84-30695
FLUORESCENCE
Visualization for a free jet by a laser induced fluorescence method and its structure N84-30120
Solid surface luminescence analysis
[DE84-011254] N84-31022
FLUOROPOLYMERS
Fluorothermoplastics for long life, weatherproof composites
[BMFT-FB-T-84-062] N84-30096
FLUTTER
Design of a candidate flutter suppression control law for DAST ARW-2
[NASA-TM-86257] N84-29883
FLUX (RATE)
Energy-resolving carbon resistance probes for plasma edge characterization
[DE84-012235] N84-30997
FLUX DENSITY
Development of a lightweight nickel electrode
[NASA-TM-83739] N84-30528
Instability of collapsing cylindrical shell during magnetic energy density N84-30872
FLY ASH
Laboratory for Energy Related Health Research
[DE84-000529] N84-30672
FOAMS
Flow of foam through porous media
[DE84-012410] N84-30246
FOCUSING
Calculation of ballistic focusing of ion beams
[DE84-012870] N84-30934
Transverse field focused system
[DE84-011070] N84-30942
FOG
Electro-optical transmission and liquid water content of fogs and clouds
[AD-A142294] N84-30597
Panama Canal Fog Navigation Study: Candidate system definition
[PB84-180793] N84-30624
Panama Canal Fog Navigation Study: System requirements statement
[PB84-179811] N84-30625
FOKKER-PLANCK EQUATION
Lower hybrid experiments at the 1 MW level on Alcator C: Heating and current drive
[DE84-010586] N84-30981
Realistic modelling of lower hybrid current drive with multiple codes
[DE84-010576] N84-30982
FORBIDDEN TRANSITIONS
A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30588
FORECASTING
Method for defining the distribution of triaxial stress states in underground structures
[DE84-010591] N84-30342
Developments of research on prediction of earthquakes, tsunami and volcanic eruptions in Far East N84-30485
Stronger direction needed for the National Earthquake Program
[GAO/RCED-83-103] N84-30570
Response to W. W. Kellogg's Carbon Dioxide and Climatic Change
[DE84-010966] N84-30577
FORESTS
Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411
Forest environments N84-30439
Forest generalization by digital raster data processing N84-30501
Weather summaries for Coram Experimental Forest, Northwestern Montana: An international biosphere reserve
[PB84-182443] N84-30615
FORMAT
A concept for the processing and display of Thematic Mapper data N84-30417
FORTRAN
COMEDG: A program to combine logically independent line segments into geometrically coherent lines N84-30499
Modular Computer System, Inc. Modular NASA extended FORTRAN 78 C.1
[PB84-180231] N84-30734
SLATEC mathematical subprogram library, version 2.0
[DE84-010750] N84-30782
FORTRAN 8x: The scientific programming language of the future
[DE84-012526] N84-30787
FOSSIL FUELS
Global biogeochemistry: An overview N84-30435
FOSSILS
Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada
[DE84-009032] N84-30610
FRACTURE MECHANICS
Stress-corrosion crack-growth study of titanium alloy Ti-6Al-4V exposed to Freon PCA and nitrogen tetroxide MON-1 N84-29923
Fatigue and Fracture Branch: A compendium of recently completed and on-going research projects
[NASA-TM-85825] N84-30331
Nonlocal continuum theory for dislocation and fracture
[AD-A142536] N84-30340
FRACTURE STRENGTH
Synthesis and toughness properties of resins and composites N84-29973
The effects of strain rate and temperature on the fracture behavior of three structural adhesives
[AD-B084418] N84-30097
FRACTURING
Analysis of fracture modes during extrusion and drawing of bimetal rods or wire
[DE84-009849] N84-30051
FRAMES
Formulation of stiffness matrices for elastic buckling of thin-walled open section prismatic columns
[TT-8402] N84-30353
System identification of structures with joint rotation
[PB84-192210] N84-30357
FRANCK-CONDON PRINCIPLE
Photoelectron studies of excited molecular states: H2 C (1)PI(sub u) and N2 o3 (1)PI(sub u)
[DE84-008883] N84-30917
Photoionization of excited molecular states using multiphoton excitation techniques
[DE84-004034] N84-30925
FREE ELECTRON LASERS
Orbital stability in combined uniform axial and three-dimensional wiggler magnetic fields for free-electron lasers
[NASA-TM-83753] N84-30273
Free electron lasers and related topics
[DE84-011332] N84-30277
Electron beam diagnostic for the Los Alamos free electron laser oscillator experiment
[DE84-011348] N84-30278
The XUV/VUV free-electron laser oscillator
[DE84-011347] N84-30279
FREE ENERGY
Interfacial interaction and adhesion in composite materials N84-29961
FREE FLIGHT
APL/JHU free flight tests of the general purpose heat source module. Testing: 5-7 March 1984
[DE84-011065] N84-30948
FREE JETS
Freejets of rotationally relaxing diatomic gases N84-30119
Visualization for a free jet by a laser induced fluorescence method and its structure N84-30120
Prediction of the temperature characteristics in intermittent, free turbulent shear layers
[CFD/84/1] N84-30256
FREON
Hydrogen fluoride formation and metal corrosion in freon-contaminated propellants N84-29921
Stress-corrosion crack-growth study of titanium alloy Ti-6Al-4V exposed to Freon PCA and nitrogen tetroxide MON-1 N84-29923
FREQUENCIES
Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions
[AD-A142483] N84-29990
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
Static frequency-temperature characteristics of doubly rotated quartz
[AD-A142456] N84-31013
Fundamental and harmonic emission in interplanetary type 2 radio bursts
[NASA-TM-86099] N84-31079
FREQUENCY CONVERTERS
A method of measuring distortion noise in digital audio equipment
[NHK-LABS-NOTE-299] N84-30174
Use of Peltier effect for small signal amplification and conversion N84-30884
FREQUENCY HOPPING
List metric detection of coded FH/MFSK (Frequency-Hopped Multiple Frequency Shift Keying) in a tone jamming environment
[AD-A142358] N84-30153
FREQUENCY MODULATION
Description of a microwave system for the measurement of close to carrier AM and FM noise spectra
[LEOK-TR-1984-04] N84-30166
FREQUENCY SHIFT KEYING
List metric detection of coded FH/MFSK (Frequency-Hopped Multiple Frequency Shift Keying) in a tone jamming environment
[AD-A142358] N84-30153
FREQUENCY STABILITY
The temperature sensitivity of doubly rotated quartz resonators
[AD-A142537] N84-30186
FRESNEL LENSES
Photovoltaic concentrators: Present status and future role
[DE84-005520] N84-30532
FRICTION MEASUREMENT
Friction in low speed lubricated rolling and sliding contacts
[VTT-16] N84-30318
FRONTS (METEOROLOGY)
Analysis of some cloud and frontal events recorded during the Boulder Upslope Cloud Observation Experiment (BUCOE) of 1982
[PB84-179662] N84-30622
FUEL CELLS
Electronics Division research and development
[DE84-011024] N84-30200
Steam reforming of fuel to hydrogen in fuel cell
[DE84-011115] N84-30205
Zinc/bromine batteries: A status review
[DE84-006973] N84-30206
Effects of H2S on molten carbonate fuel cells
[DE84-010465] N84-30531
FUEL COMBUSTION
Utilization of SRC-2 fuel in an insulated diesel engine
[DE84-004366] N84-30111
FUEL CONSUMPTION
User's manual for a fuel-conservative descent planning algorithm implemented on a small programmable calculator
[NASA-TM-86275] N84-29671
Energy efficient engine program contributions to aircraft fuel conservation
[NASA-TM-83741] N84-29676
FUEL CONTAMINATION
Hydrogen fluoride formation and metal corrosion in freon-contaminated propellants N84-29921
Electrostatic filtration of N2O4 for removal of solid and vapor contaminants N84-29922
FUEL FLOW REGULATORS
Shuttle orbiter main propulsion system hardware development and certification for flight N84-29907
FUEL OILS
Heat transfer and oil flow studies on a single-stage-to-orbit control-configured winged entry vehicle
[NASA-TM-85833] N84-29897
FUEL PRODUCTION
Two-stage process for conversion of synthesis gas to high quality transportation fuels
[DE84-009624] N84-30108
Nutritional and environmental factors in ethanol fermentation by Saccharomyces cerevisiae
[DE84-009693] N84-30110
Advancement of remote systems technology: Past perspectives and future plans
[DE84-011460] N84-30309
FUEL SPRAYS
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets N84-29963
FUEL TESTS
Aviation fuels, 1983
[DE84-011623] N84-30106
Utilization of SRC-2 fuel in an insulated diesel engine
[DE84-004366] N84-30111
FUNCTIONAL DESIGN SPECIFICATIONS
Propulsion issues for advanced orbit transfer vehicles N84-29937
FUNCTIONAL INTEGRATION
Legendre-tau approximation for functional differential equations. Part 2: The linear quadratic optimal control problem
[NASA-CR-172397] N84-30818
FUNCTIONALS
A variational formulation for dissipative maps
[REPT-81] N84-30846

FUNCTIONS (MATHEMATICS)
A Taylor series in symmetry-adaptable functions [AD-A142336] N84-30819
FURNACES
Improved graphite furnace atomizer [DE84-011091] N84-30283
FUSELAGES
Interference drag in a simulated wing-fuselage juncture [NASA-CR-3811] N84-29853
Impact dynamics research on composite transport structures N84-29975
Postbuckling behavior of graphite-epoxy panels N84-29976
Studies of noise transmission in advanced composite material structures N84-29977
FUSION REACTORS
Ceramics for fusion devices [DE84-011409] N84-30082

G

GALACTIC COSMIC RAYS
The galactic acceleration of ultrahigh energy cosmic rays [DE84-012442] N84-31080
GALACTIC NUCLEI
Photon losses in cosmic ray acceleration in active galactic nuclei [DE84-012583] N84-31081
GALACTIC STRUCTURE
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk [NASA-TM-86077] N84-31069
GALAXIES
Studies of X-ray clusters of galaxies/intergalactic plasmas [NASA-CR-173825] N84-31068
GALERKIN METHOD
Studies of Chebyshev spectral methods and multigrid methods [AD-A142014] N84-30596
Legendre-tau approximation for functional differential equations. Part 2: The linear quadratic optimal control problem [NASA-CR-172397] N84-30818
GALLIUM ARSENIDES
New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30866
Diffusion and electrical properties of sulfur implanted in gallium arsenide [AD-A142405] N84-31012
GAMMA RAYS
High-spin gamma-ray spectroscopy [DE84-010716] N84-30929
GARNETS
Noncubic magnetic anisotropy in YSmLuCaFeGe garnet films N84-30869
GAS ANALYSIS
Analyzer for determining helium-4 in the part-per-billion range [PB84-189554] N84-30272
GAS CHROMATOGRAPHY
Quality engineering and control [DE84-011603] N84-30001
Evaluation of sampling methods for gaseous atmospheric samples [PB84-190735] N84-30012
GAS COMPOSITION
Vapor spill pipe monitor [DE84-011103] N84-30267
GAS DETECTORS
Analyzer for determining helium-4 in the part-per-billion range [PB84-189554] N84-30272
GAS EXCHANGE
Exchange of gases and physical work capacity in natives of different geographic regions N84-30656
GAS EXPANSION
Engineering research on positive displacement gas expanders, phase 1 [DE84-008977] N84-30310
GAS GENERATORS
Performance verification tests of an uprated augmented catalytic thruster N84-29911
High performance, low flame temperature nitramine propellant development N84-29946
GAS HEATING
The gas-heating phase in electrical breakdown [AD-A141961] N84-30967
GAS LASERS
Efficient forward conversion in a Raman generator [DE84-007466] N84-30285
GAS MIXTURES
Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654
Excitation of sound by light N84-30863
GAS TURBINE ENGINES
PURDU-WINCOF: A computer code for establishing the performance of a fan-compressor unit with water ingestion [NASA-CR-168005] N84-29875
Sputter-deposited metallic and ceramic coatings for heat engines [DE84-011401] N84-30030
Atomization of liquid sheets in high pressure airflow [NASA-TM-83731] N84-30223
GAS TURBINES
Space Shuttle Orbiter improved auxiliary power unit N84-29865
GAS WELDING
Characterization of submerged-arc and gas-metal-arc weldments in hY-100 steel [AD-A141939] N84-30298
GASEOUS DIFFUSION
Diffusion of gases in porous solids: Simulations and measurements [DE84-010822] N84-30241
GASES
Kinetic processes in high pressure gases. Excited state collisions [AD-A141927] N84-30016
GATES (CIRCUITS)
A simulation program with latency exploitation for the transient analysis of digital circuits [AD-A142377] N84-30181
Gate arrays — integrated circuits [AD-B082958] N84-30214
HgCdTe surface and defect study program [AD-A142342] N84-31010
GAUGE INVARIANCE
Staggered fermions and rotation-gauge invariance [PREPRINT-357] N84-30937
Renormalized action improvements [DE84-011810] N84-31028
GAUGE THEORY
Supersymmetric nonlinear sigma models constrained on a noncompact manifold [PREPRINT-356] N84-30843
Research program in elementary particle theory [DE84-011502] N84-30933
Staggered fermions and rotation-gauge invariance [PREPRINT-357] N84-30937
High energy nuclear structures [DE84-010062] N84-30947
Stochastic quantization: Stabilizing quantum models [REPT-80] N84-31032
GEARS
Summary of drive-train component technology in helicopters [NASA-TM-83726] N84-30294
GENERAL AVIATION AIRCRAFT
Experimental study of noise transmission into a general aviation aircraft [NASA-CR-172357] N84-30888
GENETICS
Organophosphate toxicity: Genetics, receptors, and antidotes [AD-A141059] N84-30685
GEOCHEMISTRY
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review [DE84-009432] N84-30557
Proposed scientific activities for the Salton Sea scientific drilling project [DE84-012256] N84-30586
GEODESY
The ERODYN and QRPIG computer programs N84-30468
Geodynamics [NASA-CP-2325] N84-30475
GEODETIC ACCURACY
Geodetic accuracy of LANDSAT-4 Multispectral Scanner and Thematic Mapper data N84-30399
Radiometric calibration and geocoded precision processing of LANDSAT-4 Multispectral Scanner products by the Canada Centre for Remote Sensing N84-30404
LANDSAT-4 MSS geometric correction: Methods and results N84-30409
GEODYNAMICS
Research activities of the Geodynamics Branch [NASA-TM-86123] N84-30455
Update: San Andreas Fault experiment N84-30456
Crustal deformation and earthquakes N84-30457
Results of laser ranging collocations during 1983 N84-30458
A comparison between Lageos laser ranging and VLBI determined baselines N84-30459
Geodynamics of crustal deformation and seismotectonic block movements in central Europe N84-30460
Analysis of the Earth's variable rotation N84-30462
SEASAT observations of lithospheric flexure N84-30463
Geodyn systems development N84-30467
Geodynamics [NASA-CP-2325] N84-30475
Geodynamics: Introduction and background N84-30476
Projection for space geodynamics, 1988-1998 N84-30477
Recommended program activities, 1988-1998 N84-30478
MULAP4: A multi-linear analysis program for ground motion studies of horizontally layered systems [PB84-182815] N84-30591
GEOELECTRICITY
Report of the geomagnetic and geoelectric observations, 1982 (rapid variations) [KMO-23] N84-30567
GEOGRAPHY
Global Biology Research Program: Biogeochemical Processes in Wetlands [NASA-CP-2316] N84-30665
Geographic distribution of wetland parameters: The foundation of a data base N84-30667
Report on functional design specification for the automated alphanumeric data entry system [AD-A142518] N84-30725
GEOIDS
Global mean sea surface based upon SEASAT altimeter data N84-30470
GEOLOGICAL SURVEYS
Analysis of LANDSAT-4 TM data for lithologic and image mapping purpose N84-30390
Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413
Stratigraphic and volcano-tectonic relations of Crater Flat Tuff and some older volcanic units, Nye County, Nevada [DE84-010926] N84-30584
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 1: Executive summary [PB84-187939] N84-30639
Environmental geologic studies on the United States mid-and north Atlantic outer continential shelf area, 1980-1982. Volume 3: North Atlantic region [PB84-187954] N84-30641
GEOLOGY
Geology N84-30442
Inevitable climatic changes N84-30480
Geotechnical and geologic design considerations for a shelf mounted OTEC (Ocean Thermal Energy Conversion) facility [PB84-186147] N84-30554
An assessment of methods of geological basin analysis for application to the Uinta and Piceance Basins [DE84-012369] N84-30581
Proposed scientific activities for the Salton Sea scientific drilling project [DE84-012256] N84-30586
Environmental geologic studies on the United States mid-and north Atlantic outer continential shelf area, 1980-1982. Volume 3: North Atlantic region [PB84-187954] N84-30641
GEOMAGNETISM
Geodynamics [NASA-CP-2325] N84-30475
Projection for space geodynamics, 1988-1998 N84-30477
Report of the geomagnetic and geoelectric observations, 1982 (rapid variations) [KMO-23] N84-30567
Derivation of crustal magnetic anomalies from MAGSAT [REPT-609] N84-30569
Solar-geophysical data number 473. Part 1: (Prompt reports) data for December 1983, November 1983 and late data [PB84-180611] N84-31073
Solar-geophysical data number 473. Part 2: (Comprehensive reports) data for July 1983, March 1961 and miscellanea [PB84-180629] N84-31074
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984 [PB84-188689] N84-31076
Solar-geophysical data explanation of reports, February 1984, number 474, supplement [PB84-188697] N84-31078

GEOMETRIC ACCURACY

An overview of the Thematic Mapper geometric correction system N84-30367

A preliminary assessment of LANDSAT-4 Thematic Mapper data N84-30377

LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30380

An analysis LANDSAT-4 Thematic Mapper geometric properties N84-30392

The use of linear feature detection to investigate Thematic Mapper data performance and processing N84-30393

An analysis of the high frequency vibrations in early Thematic Mapper scenes N84-30395

Tests of low-frequency geometric distortions in LANDSAT-4 images N84-30397

Geometric accuracy of LANDSAT-4 MSS image data — Georgia N84-30406

Geometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) — Washington, D.C. N84-30407

GEOMETRIC RECTIFICATION (IMAGERY)

Thematic Mapper Image Processing System (TIPS) processing status N84-30368

Thematic Mapper image production in the engineering checkout phase N84-30369

LANDSAT-4 radiometric and geometric correction and image enhancement results --- San Francisco Bay, California N84-30370

An analysis LANDSAT-4 Thematic Mapper geometric properties N84-30392

LANDSAT-4 MSS geometric correction: Methods and results N84-30409

GEOMETRY

Reduced equations in three dimensional geometry
[DE84-009401] N84-30841

Research program in elementary particle theory
[DE84-011502] N84-30933

GEOMORPHOLOGY

Dependence of crustal structure of eastern Pacific Ocean on its age N84-30483

Structure of ocean floor in relation to conditions for formation of lithosphere N84-30484

GEOPHYSICAL FLUIDS

Inertial and shear flow N84-30874

GEOPHYSICS

Interior of the Earth N84-30443

Crustal deformation and earthquakes N84-30457

A comparison between Lageos laser ranging and VLBI determined baselines N84-30459

The ERODYN and QRPIG computer programs N84-30468

USSR report: Earth sciences
[JPRS-UES-84-006] N84-30479

Geokinetic effects on motion sensitive instrumentation, systems and facilities
[AD-A142682] N84-30575

Stratigraphic and volcano-tectonic relations of Crater Flat Tuff and some older volcanic units, Nye County, Nevada
[DE84-010926] N84-30584

Proposed scientific activities for the Salton Sea scientific drilling project
[DE84-012256] N84-30586

Solar-geophysical data number 473. Part 1: (Prompt reports) data for December 1983, November 1983 and late data
[PB84-180611] N84-31073

Solar-geophysical data number 473. Part 2: (Comprehensive reports) data for July 1983, March 1981 and miscellanea
[PB84-180629] N84-31074

GEOPOTENTIAL

Geodynamics
[NASA-CP-2325] N84-30475

GEORGIA

Delineation of wetland boundaries using vegetation within the Altamaha River Basin of Georgia
[AD-A142590] N84-30515

GEOSYNCHRONOUS ORBITS

Spectrum/orbit utilization program for geostationary satellites
[NASA-TM-83759] N84-30146

GEOTHERMAL RESOURCES

Inventory of geothermal resources in Nebraska
[DE84-009679] N84-30518

Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys
[DE84-012547] N84-30519

Geothermal potential along the Balcones/Ouachita trend, central Texas: Ongoing assessment and selected case studies
[DE84-010826] N84-30578

Using chemically reactive tracers to determine temperature characteristics of geothermal reservoirs
[DE84-011373] N84-30580

GEOTHERMAL TECHNOLOGY

Economics of a conceptual 75 MW hot dry rock geothermal electric power station
[DE83-015926] N84-30539

GERMANIUM

Electron-microscopic microstructural examination of glassy Ge-Se semiconductors N84-30871

GETTERS

Method of enhancing selective isotope desorption from metals
[DE84-011031] N84-30044

GLACIOLOGY

Polar glaciology N84-30445

GLASS

Characterization of filament wound Kevlar and glass composites for rocket motor applications N84-29949

Study of the fatigue crack propagation characteristics of YB-3 and YB-4 aeronautical organic glass N84-30069

Alkali-free phosphate glasses for high temperature, high electrical resistivity applications
[DE84-011533] N84-30091

Joining silicon nitride based ceramics: A technical assessment
[DE84-011356] N84-30092

Quality control analysis of TA-23 glass seals for lithium ambient temperature batteries
[DE84-011719] N84-30094

Capillary separations with calorimetric absorbance detection
[DE84-012468] N84-30291

Ceramic-glass-metal seal by microwave heating
[DE84-011283] N84-30295

GLOW DISCHARGES

Impurity characteristics of TMX-U
[DE84-012413] N84-30932

GLUCOSE

Delayed effects of proton irradiation in Macaca mulatta. 3: Glucose intolerance
[AD-A142289] N84-30669

GLUTAMIC ACID

Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681

GLYCERIDES

Combustion of GAP, part 1 N84-29952

Kevlar-49/epoxy case skirt structural fatigue strength N84-29955

GLYCOLS

Nitrate ester polyether glycol prepolymers N84-29947

GOLD

Holographic interferometry using 20-picosecond UV pulses to obtain time resolved hydro measurements of selenium and gold plasmas
[DE84-009485] N84-30269

GOVERNMENT PROCUREMENT

Improving system affordability
[AD-A142387] N84-31062

GOVERNMENT/INDUSTRY RELATIONS

Photovoltaics: Electricity from Sunlight, five-year research plan, 1984-1988
[DE84-010679] N84-30544

Cabin air quality
[GPO-29-522] N84-30702

Science and technology report to the Congress, 1982
[DE84-901150] N84-31040

National Science Foundation, volume 1
[PB84-193234] N84-31061

GOVERNMENTS

Remote sensing and the private sector: Issues for discussion
[PB84-160777] N84-30520

Government acronyms and alphabetic organizational designations used in DTIC (Defense Technical Information Center)
[AD-A142700] N84-31049

GRADIENTS

Definition of the concentration gradient above flammable liquids
[DE84-008296] N84-29996

Moving finite elements in 2-D. Technical report: Year 3
[DE84-008551] N84-30840

GRAIN BOUNDARIES

The role of sintering in the oxidation-reduction of palladium powders
[DE84-011202] N84-30059

GRANTS

Report of accomplishments under the airport improvement program
[AD-A142444] N84-29889

Technical assistance and information dissemination for the appropriate technology small grants program
[DE84-010957] N84-31042

GRANULAR MATERIALS

Application of molecular dynamics to macroscopic particles
[DE84-011066] N84-30244

GRAPHIC ARTS

Reports on cartography and geodesy. Series 1: Original reports, number 92
[ISSN-0469-4236] N84-30495

A system for automatic digitization of cartographic line drawings N84-30506

GRAPHITE

Graphite-ceramic RF Faraday-thermal shield and plasma limiter
[DE84-010960] N84-30086

Improved graphite furnace atomizer
[DE84-011091] N84-30263

The use of isotopically-enriched carbon probes for erosion deposition measurements in the ASDEX divertor
[DE84-012329] N84-31006

GRAPHITE-EPOXY COMPOSITES

Development and fabrication of a graphite/epoxy motor case for air launch missile applications N84-29948

Rapid adhesive bonding concepts
[NASA-TM-86256] N84-29968

Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970

Tensile strength of composite sheets with unidirectional stringers and crack-like damage N84-29974

Postbuckling behavior of graphite-epoxy panels N84-29976

A study of stiffness, residual strength and fatigue life relationships for composite laminates
[NASA-CR-172211] N84-29978

GRATINGS (SPECTRA)

Switchable zero order diffraction gratings as light valves
[AD-A142513] N84-30953

GRAVIMETRY

Research activities of the Geodynamics Branch
[NASA-TM-86123] N84-30455

Interpreting three-dimensional gravitational and magnetic anomalies N84-30486

GRAVITATION

Geodyn systems development N84-30467

Projection for space geodynamics, 1988-1998 N84-30477

GRAVITATIONAL EFFECTS

NASA space biology accomplishments, 1983-84
[NASA-TM-86654] N84-30664

GRAVITATIONAL FIELDS

Accuracy of mapping the Earth's gravity field fine structure with a spaceborne gravity gradiometer mission N84-30473

GRAVITY ANOMALIES

Interpreting three-dimensional gravitational and magnetic anomalies N84-30486

GRAVSAT SATELLITE

Interior of the Earth N84-30443

GRAZING INCIDENCE

Measurements of high resolution spectra on the Omega laser at Rochester University
[DE84-012419] N84-30290

GREASES

Thickener/fluid interaction in lubricating greases
[AD-A142276] N84-30076

GREAT LAKES (NORTH AMERICA)

Partitioning of toxic trace metals between solid and liquid phases in the Great Lakes
[PB84-177849] N84-30525

GREENHOUSE EFFECT

Response to W. W. Kellogg's Carbon Dioxide and Climatic Change
[DE84-010986] N84-30577

GROUND BASED CONTROL

Study of the FAA (Federal Aviation Administration) program to modernize maintenance operations
[AD-A142295] N84-29848

GROUND STATIONS

Sensitivity of SLR baselines to errors in Earth orientation N84-30461

GROUND SUPPORT SYSTEMS

LANDSAT-4 system description N84-30361

GROUND TRUTH

In-flight absolute radiometric calibration of the Thematic Mapper N84-30383

LANDSAT-4 Thematic Mapper calibration and atmospheric correction N84-30384

Calibration of TM data from ground-based measurements N84-30385

MTF analysis of LANDSAT-4 Thematic Mapper N84-30388

GROUND WATER
Thermal ground water flow systems in the thrust zone in southeastern Idaho
[DE84-011598] N84-30517
Water resources data for Massachusetts and Rhode Island, water year 1982
[PB84-180009] N84-30521
Water resources data for Arkansas, water year 1982
[PB84-181296] N84-30522
Estimation of recharge in a small southern Arizona basin by means of hydrological, hydrochemical, and environmental isotope data
[PB84-159672] N84-30527
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557
Geothermal potential along the Balcones/Ouachita trend, central Texas: Ongoing assessment and selected case studies
[DE84-010826] N84-30578
GROUP THEORY
Stabilization studies
[AD-A142644] N84-30832
GROWTH
Forest environments N84-30439
GUNS (ORDNANCE)
On the extremum of bilinear functional for hyperbolic type partial differential equations
[AD-A142505] N84-30828
GUST LOADS
Review and comparison of discrete and continuous gust methods for the determination of airplane design loads
[NLR-TR-82134-U] N84-29886

H

H ALPHA LINE
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188669] N84-31076
Solar-geophysical data comprehensive reports, February 1984, number 474. Part 2: Data for August 1983, April 1981 and miscellanea. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188671] N84-31077
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
HALIDES
Inductively stabilized excimer lasers
[DE84-011371] N84-30284
HALL EFFECT
Quasi-two-day variation of lower thermosphere wind velocities N84-30488
Fractional quantization of the Hall effect
[DE84-008894] N84-31023
HAMILTONIAN FUNCTIONS
Hamiltonian structure of field-line equations
[DE84-011019] N84-30836
A variational formulation for dissipative maps
[REPT-81] N84-30846
HAND (ANATOMY)
Evaluation of arm protheses for unilateral amputees
N84-30713
HANDBOOKS
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures
[AD-A142424] N84-29866
Linear systems analysis program user's manual, version 2.2 (VAX/VMS)
[DE84-012230] N84-30789
HANDICAPS
Man-machine systems group
[WTHD-161] N84-30703
The Man-Machine Systems Group N84-30704
Information processing for use in the treatment of severely physically handicapped persons N84-30711
Communication aids for the handicapped N84-30715
HARDENING (MATERIALS)
Surface layer effects on the mechanical behavior of metals
[AD-A142280] N84-30018
Thermomechanical processing and texture development in Ni-Cr-Mo and Mn-Mo-B armor steels
[AD-A142352] N84-30020
HARMONIC ANALYSIS
A Taylor series in symmetry-adaptable functions
[AD-A142336] N84-30819
HARMONIC OSCILLATORS
The transfer of atoms, ions and molecular groups in solution. Part 2: Tunnelling between harmonic wells
[AD-A142334] N84-29982
HARMONICS
Experiments and theory on half-harmonic light and 2-plasmon decay
[DE84-008945] N84-30276
Dual aperture dipole magnet with second harmonic component
[DE84-011305] N84-30856
Optical second-harmonic generation for surface studies
[DE84-010718] N84-30958
Fundamental and harmonic emission in interplanetary type 2 radio bursts
[NASA-TM-86099] N84-31079
HARTREE APPROXIMATION
Determination of energetics and spectra of simple molecular systems using theoretical methods
[DE84-009668] N84-30930
HAZARDS
Ground penetrating radar: A review of its application in the mining industry, information circular 1984
[PB84-178292] N84-30172
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30608
HEAD-UP DISPLAYS
Horizontal diplopia thresholds for head-up displays
[AD-A141965] N84-29872
HEAT
Sputter-deposited metallic and ceramic coatings for heat engines
[DE84-011401] N84-30030
HEAT EXCHANGERS
The heat pipe exchanger with controllable heat exchanging area N84-30124
HEAT FLUX
Spatial distribution of advective heat influxes in atmosphere over Northern Hemisphere and its relationship to heat influxes from ocean N84-30482
Magnetic fusion energy plasma interactive and high heat flux components. Volume 1: Technical assessment of the critical issues and problem areas in the plasma materials interaction field
[DE84-011527] N84-30969
HEAT OF VAPORIZATION
Dust particles in high speed flows: Calculations of small particle reentry hydrodynamics
[DE84-010998] N84-30245
HEAT PIPES
Remarks on thermal analyses of thin 4He films in superfluid heat pipe N84-30121
An experimental study of helical guide-type rotating heat pipe N84-30123
The heat pipe exchanger with controllable heat exchanging area N84-30124
Experimental study of the naphtaline heat pipe
N84-30125
Research and development of long heat pipes and their applications — heating road surfaces on bridges
N84-30126
Study of latent heat storage system used heat pipes for cooling of underground cables N84-30127
Heat pipe technology issues
[DE84-011384] N84-30248
Some scoping experiments for a space reactor
[DE84-009101] N84-30941
HEAT PUMPS
Advanced electric heat pump dual-stroke compressor and system development
[DE84-007916] N84-30239
HEAT RESISTANT ALLOYS
High-temperature alloys: Theory and design
[DE84-010428] N84-30029
Ductile aluminide alloys for high temperature applications
[DE84-011037] N84-30038
Influences of directionally solidified techniques and hafnium content on a nickel base high temperature alloy
N84-30064
Characteristics of initial period fatigue crack propagation of metals and its affecting factors N84-30071
HEAT SOURCES
APL/JHU free flight tests of the general purpose heat source module. Testing: 5-7 March 1984
[DE84-011065] N84-30948
HEAT STORAGE
Study of latent heat storage system used heat pipes for cooling of underground cables N84-30127
HEAT TRANSFER
Heat transfer and oil flow studies on a single-stage-to-orbit control-configured winged entry vehicle
[NASA-TM-85833] N84-29897
High pressure LOX/natural gas staged combustion technology N84-29927
Generalized roughness effects on turbulent boundary layer heat transfer. A discrete element predictive approach for turbulent flow over rough surfaces
[AD-A141943] N84-30227
Open cycle lithium chloride cooling system
[DE84-005831] N84-30234
Thermal laminarization of a stratified pipe flow
[DE84-006407] N84-30236
TOPAZ: A finite element heat conduction code for analyzing 2-D solids
[DE84-010676] N84-30247
Nonlocal heat transport by non-Maxwellian electrons
[DE84-012391] N84-31000
HEAT TRANSFER COEFFICIENTS
An experimental study of helical guide-type rotating heat pipe N84-30123
Experimental study of the naphtaline heat pipe
N84-30125
HEAT TREATMENT
Study of high performance alloy electroforming
[NASA-CR-173828] N84-30013
Grain-refining heat treatments to improve cryogenic toughness of high-strength steels
[NASA-TM-85816] N84-30014
Aeronautical Materials (selected articles)
[AD-A139952] N84-30063
Influence of temperature on the Delta K sub th and da/dN of LY-12CS aluminum alloy N84-30067
HEATING
Ceramic-glass-metal seal by microwave heating
[DE84-011283] N84-30295
Soliton collapse during ionospheric heating
[DE84-009994] N84-30576
Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30881
HEATING EQUIPMENT
Aerodynamic and Propulsion Test Unit (APTU) performance with a vitiated air heater N84-29964
HEAVY IONS
The Earth's radiation belts
[AD-A142673] N84-30574
A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912
HEIGHT
Invariance of level of rotating liquid
[BLL-M-35611-(5828.4)] N84-30220
SEASAT altimetry for surface height of inland seas
N84-30472
HELICAL INDUCERS
An experimental study of helical guide-type rotating heat pipe N84-30123
HELICOPTER CONTROL
Improved pilot model for application to a computer flight testing program for helicopters
[NLR-MP-83052-U] N84-29869
HELICOPTER DESIGN
Transmission efficiency measurements and correlations with physical characteristics of the lubricant
[NASA-TM-83740] N84-30293
Summary of drive-train component technology in helicopters
[NASA-TM-83726] N84-30294
HELICOPTER PROPELLER DRIVE
Summary of drive-train component technology in helicopters
[NASA-TM-83726] N84-30294
HELICOPTERS
Field repair of AH-1S helicopter window cutting assemblies
[NASA-TM-85831] N84-29864
Worldwide flight and ground-based exposure of composite materials N84-29971
Analysis of computer interactive tests for assigning helicopter pilots to different missions
[AD-A142434] N84-30696
The influence of a wind tunnel on helicopter rotational noise: Formulation of analysis
[NASA-TM-85982] N84-30887
HELIOSPHERE
Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30980
HELIOSTATS
Technical and cost potential for lightweight, stretched-membrane heliostat technology
[DE84-004433] N84-30543
HELIUM
Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy
[DE84-012111] N84-30053
Improved gaseous leak detector
[DE84-011295] N84-30265
Analyzer for determining helium-4 in the part-per-billion range
[PB84-189554] N84-30272

HELIUM ISOTOPES
Remarks on thermal analyses of thin 4He films in superfluid heat pipe N84-30121
He-3 cooling systems for space
[NASA-TM-85985] N84-30226
HEMODYNAMICS
USSR report: Space Biology and Aerospace Medicine, vol. 18, no. 3, May - June 1984
[JPRS-USB-84-005] N84-30642
Walking erect as a factor in devlopment of arterial hypertension in primates N84-30645
Effect of dihydroergotamine on human circulation during orthostatic tests N84-30646
Circulatory changes in orthostatic position in the presence of hyperthermia N84-30647
HETEROCYCLIC COMPOUNDS
Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaammineosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands
[AD-A142418] N84-29987
Ultraviolet light absorbers having 2 different chromophors in the same molecule
[DE84-011279] N84-30000
HETEROGENEITY
The effect of point-spread function interaction with radiance from heterogeneous scenes on multitemporal signature analysis — soybean stress N84-30400
HEWLETT-PACKARD COMPUTERS
Automation assisted gathering, processing, and representation of topographic data for the production of the German basic map 1:5000 - height in Lower Saxony N84-30500
HIGH ALTITUDE BREATHING
Individual distinctions of human sleeping respiration at altitude of 4200 meters N84-30663
HIGH ALTITUDE ENVIRONMENTS
Use of vitamins during adaptation to high altitudes N84-30643
HIGH CURRENT
Diagnostics of a high current capillary discharge
[DE84-011369] N84-30194
HIGH ENERGY ELECTRONS
Plasma simulation studies of electron acceleration for beat wave and single frequency-laser heating schemes
[DE84-009988] N84-30992
HIGH ENERGY INTERACTIONS
Indiana University Theoretical Particle Physics Group
[DE84-010593] N84-30903
High energy nuclear structures
[DE84-010062] N84-30947
Activities in nuclear and high energy physics
[B8467321] N84-30949
Simulation of ultra-low emittance electron storage rings
[DE84-012050] N84-31024
HIGH FREQUENCIES
An analysis of the high frequency vibrations in early Thematic Mapper scenes N84-30395
Preliminary report of HF radar measurements of surface currents east of the Strait of Gibraltar near Marbella, Spain, 7-22 October 1982, part 2
[PB84-183664] N84-30637
HIGH POWER LASERS
Reflex ring laser amplifier system
[DE84-010874] N84-30282
Nova laser alignment control system
[DE84-010992] N84-30288
HIGH PRESSURE
Kinetic processes in high pressure gases. Excited state collisions
[AD-A141927] N84-30016
HIGH RESOLUTION
High resolution electron microscopy studies of the early stages of decomposition in alloys and ceramics
[DE84-020802] N84-30087
High resolution, high rate X-ray spectrometer
[DE84-011116] N84-30266
Measurements of high resolution spectra on the Omega laser at Rochester University
[DE84-012419] N84-30290
Measurements of spatially resolved high resolution spectra of laser-produced plasmas
[DE84-012418] N84-30995
HIGH REYNOLDS NUMBER
Description and validation of the two dimensional test setup for multiple airfoils in the pressurized wind tunnel HST
[NLR-TR-83031-U] N84-29892
HIGH STRENGTH STEELS
Grain-refining heat treatments to improve cryogenic toughness of high-strength steels
[NASA-TM-05816] N84-30014
Influence of processing on the cryogenic mechanical properties of high strength high manganese stainless steel
[DE84-008242] N84-30027
HIGH TEMPERATURE
Mechanisms of intergranular failures in Alloy 600 in high temperature environments
[DE84-010514] N84-30033
The role of sintering in the oxidation-reduction of palladium powders
[DE84-011202] N84-30059
Self-propagating high-temperature synthesis of ceramics in vacuum
[AD-A142506] N84-30079
New experimental techniques with the split Hopkinson pressure bar
[DE84-003818] N84-30268
A new optical technique for rapid determination of creep and fatigue thresholds at high temperature
[AD-A142675] N84-30341
HIGH TEMPERATURE ENVIRONMENTS
Intergranular failures of Alloy 600 in high temperature caustic environments
[DE84-010690] N84-30032
Mechanisms of intergranular failures in Alloy 600 in high temperature environments
[DE84-010514] N84-30033
HIGH TEMPERATURE FLUIDS
Rotational viscometer for high-pressure, high-temperature fluids
[DE84-011094] N84-30264
HIGH TEMPERATURE LUBRICANTS
High-temperature lubricants for minimum-cooled diesel engines
[AD-A142426] N84-30078
HIGH TEMPERATURE PLASMAS
High resolution, high rate X-ray spectrometer
[DE84-011116] N84-30266
Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900
HINGES
Flexure hinge
[PB84-178557] N84-30319
HISTIDINE
Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680
HISTOCHEMICAL ANALYSIS
Use of sperm enzymes to detect genotoxic agents
[AD-A142724] N84-30691
HISTORIES
Some aerodynamic discoveries and related NACA/NASA research programs following World War 2
[NASA-TM-86258] N84-29647
The LANDSAT-4 program: An overview N84-30360
HOLE DISTRIBUTION (MECHANICS)
Effects of variations in coldworking repair procedures on flaw growth and structural life
[AD-A141966] N84-30336
HOLE GEOMETRY (MECHANICS)
Strains in an elastic plate containing an interference-fit bolt near a free edge
[AR-003-012] N84-30333
HOLOGRAPHIC INTERFEROMETRY
Holographic FLI for detection of defects
[AD-A142733] N84-30258
Holographic interferometry using 20-picosecond UV pulses to obtain time resolved hydro measurements of selenium and gold plasmas
[DE84-009485] N84-30269
HOLOGRAPHIC SUBTRACTION
Holographic image subtraction by recording in Fourier plane and space filtration with thin light beam N84-30882
HOMEOSTASIS
Engineering physiology: New area for use of control theory N84-30676
HOMOSPHERE
On molecular scattering in the terrestrial atmosphere: An empirical formula for its calculation in the homosphere
[AERONOMICA-ACTA-A-284-1984] N84-30564
HOSPITALS
Information processing for use in the treatment of severely physically handicapped persons N84-30711
HOT CORROSION
Sulfidation- and oxidation-resistant ferritic stainless steel containing aluminum
[PB84-189521] N84-30101
HUMAN BEINGS
Effect of high ammonia content in pressure chamber atmosphere on human adrenocortical system function N84-30658
Nomogram for demonstrating change in central venous and pulmonary artery pressure during decompression of different parts of the body N84-30660
Dependence of blood coagulating and fibrinolytic systems on functional state of lysosomal system of neutrophil leukocytes during exposure of the body to low barometric pressure N84-30661
HUMAN FACTORS ENGINEERING
Dual arm master controller concept: Consolidated fuel reprocessing program
[NASA-CR-173843] N84-30298
Orientation of ergonomic aspects of the Universal Dynamometer Device — vehicle testing
[IZF-1983-25] N84-30315
Engineering physiology: New area for use of control theory N84-30676
Man-machine systems group
[WTHD-161] N84-30703
Communication aids for the handicapped N84-30715
Operator performance on flat-panel displays with line and cell failures
[AD-A142340] N84-30716
HUMAN PERFORMANCE
An assessment of interactive graphics processing in short-range terminal weather forecasting
[AD-A142706] N84-30601
Use of vitamins during adaptation to high altitudes N84-30643
Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654
Biomagnetism: Possible new predictor of personnel performance
[AD-A142451] N84-30697
A model of inter-organizational influences on organizational processes
[AD-A142450] N84-31037
HUMAN TOLERANCES
Horizontal diplopia thresholds for head-up displays
[AD-A141965] N84-29872
HUMERUS
A model of the shoulder girdle for use in rehabilitation N84-30710
HURRICANES
National Weather Service hurricane probability program
[PB84-182757] N84-30619
HUYGENS PRINCIPLE
Vortex methods and turbulent combustion
[DE84-011874] N84-30004
HYDRAULIC EQUIPMENT
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868
HYDRAULIC FLUIDS
In-stream distribution and hydraulic and ecological effects of volcanic ash from Mount St. Helens eruption
[PB84-169382] N84-30526
HYDRAZINES
Hydrogen fluoride formation and metal corrosion in freon-contaminated propellants N84-29921
HYDROCARBON FUELS
LOX/CH4 for reusable high performance booster engines N84-29926
HYDROCARBONS
Theory of the electronic structure and optical properties of organic solids: Exciton effects
[AD-A142544] N84-29993
HYDRODYNAMIC EQUATIONS
Wave uplift pressure on horizontal platforms
[PB84-190628] N84-30257
HYDRODYNAMICS
Atomization of liquid sheets in high pressure airflow
[NASA-TM-83731] N84-30223
Thermal laminarization of a stratified pipe flow
[DE84-006407] N84-30236
Dust particles in high speed flows: Calculations of small particle reentry hydrodynamics
[DE84-010998] N84-30245
INFIL1D: A quasi-analytical model for simulating one-dimensional, constant flux infiltration
[DE84-008905] N84-30250
Wave uplift pressure on horizontal platforms
[PB84-190628] N84-30257
The breaking of ocean surface waves
[AD-A142356] N84-30829
On measuring the acoustic intensity of hydroacoustic sources
[AD-A142484] N84-30893
HYDROFLUORIC ACID
Hydrogen fluoride formation and metal corrosion in freon-contaminated propellants N84-29921
HYDROGEN
Experimental facilities to study hydrogen combustion and detonation
[DE84-008998] N84-29997
Coated silica shells: An advanced hydrogen storage system
[DE84-008986] N84-30088

Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918

HYDROGEN EMBRITTLEMENT
Cadmium plating versus other coatings to prevent corrosion
[AD-A142504] N84-30022

HYDROGEN ISOTOPES
Method of enhancing selective isotope desorption from metals
[DE84-011031] N84-30044

HYDROGEN PRODUCTION
Photovoltaic-electrolyzer system transient simulation results
[DE84-010217] N84-29995
Engineering scoping study of the production of hydrogen and oxygen from the cerium oxide-sodium phosphate/carbonate thermochemical cycle
[DE84-010629] N84-29996
Chemical-hydrogen energy systems
[DE84-012876] N84-30112
Steam reforming of fuel to hydrogen in fuel cell
[DE84-011115] N84-30205
Photo/Biological Hydrogen Principal Investigators Review Meeting: Proceedings of the May 1983 Program Review
[DE84-000063] N84-30536

HYDROGEN SULFIDE
Effects of H2S on molten carbonate fuel cells
[DE84-010465] N84-30531

HYDROGEOLOGY
Polar glaciology N84-30445
Geothermal potential along the Balcones/Ouachita trend, central Texas: Ongoing assessment and selected case studies
[DE84-010626] N84-30578

HYDROLOGY
Snow reflectance from LANDSAT-4 Thematic Mapper
N84-30426
Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications
N84-30431
Earth Observing System. Volume 1, part 2: Science and mission requirements. Working group report appendix
[NASA-TM-86129] N84-30433
Global hydrologic cycle N84-30434
Thermal ground water flow systems in the thrust zone in southeastern Idaho
[DE84-011596] N84-30517
Estimation of recharge in a small southern Arizona basin by means of hydrological, hydrochemical, and environmental isotope data
[PB84-159672] N84-30527

HYDROLYSIS
Lead zirconate-lead titanate (PZT) ceramics from organic-derived precursors
[DE84-009921] N84-30095

HYDROTHERMAL SYSTEMS
Proposed scientific activities for the Salton Sea scientific drilling project
[DE84-012256] N84-30586

HYDROXIDES
Investigation of the role of sintering in gas-solid interactions
[DE84-010662] N84-30089

HYDROXYL RADICALS
Detection of NH-2O-radicals by far-infrared laser magnetic resonance spectroscopy
[MPIS-6/1984] N84-30010

HYPERBOLIC DIFFERENTIAL EQUATIONS
On the extremum of bilinear functional for hyperbolic type partial differential equations
[AD-A142505] N84-30628

HYPERCAPNIA
Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere
N84-30655
Exchange of gases and physical work capacity in natives of different geographic regions N84-30656

HYPERNUCLEI
Hypernuclear research at the AGS
[DE84-010282] N84-30915

HYPERTENSION
Walking erect as a factor in development of arterial hypertension in primates N84-30645

HYPERTHERMIA
Circulatory changes in orthostatic position in the presence of hyperthermia N84-30647

HYPOKINESIA
USSR report: Space Biology and Aerospace Medicine, vol. 18, no. 3, May - June 1984
[JPRS-USB-84-005] N84-30642
Effect of dihydroergotamine on human circulation during orthostatic tests N84-30646
Blood plasma free amino acids under hypokinetic conditions N84-30648
Human stomach motor and evacuatory functions during antiorthostatic hypokinesia N84-30649
Circadian pattern of simian functional parameters during hypokinesia and in the recovery period N84-30650
Dynamics of red blood cell changes in rats during acute immobilization N84-30651
Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652

HYPOTHALAMUS
Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere
N84-30655

HYPOTHERMIA
Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere
N84-30655

HYPOXIA
Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere
N84-30655
Individual distinctions of human sleeping respiration at altitude of 4200 meters N84-30663

HYSTERESIS
Effects of bond deterioration on hysteretic behavior of reinforced concrete joints
[PB84-192020] N84-30343

I

I BEAMS
Impact dynamics research on composite transport structures N84-29975

ICE
Comparison of icing cloud instruments for 1982-1983 icing season flight program
[NASA-TM-83569] N84-29670
A description of the MIZEX 1984 remote sensing activities
[AD-A142296] N84-30514

ICE ENVIRONMENTS
Polar glaciology N84-30445

ICE MAPPING
Meteorological research and support for the MIZEX (Marginal Ice Zone Experiment) program
[AD-A142409] N84-30598

IDAHO
Thermal ground water flow systems in the thrust zone in southeastern Idaho
[DE84-011596] N84-30517

IFF SYSTEMS (IDENTIFICATION)
F-15 AN/APG-63 radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142071] N84-29873

IGNITERS
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
Integral low-energy thermite igniter
[DE84-011082] N84-29999

IGNITION
Very low thrust and low chamber pressure GO2/GH2 thruster technology N84-29910
High pressure LOX/natural gas staged combustion technology N84-29927
Modeling chemical kinetic aspects of engine knock
[DE84-009674] N84-30312

ILLUMINATING
Daylight availability as a function of atmospheric conditions
[DE84-007973] N84-30609

IMAGE ANALYSIS
Geodetic accuracy of LANDSAT-4 Multispectral Scanner and Thematic Mapper data N84-30399
Radiometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) data — Vermont
N84-30401
Geometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) — Washington, D.C.
N84-30407
Impact of LANDSAT MSS sensor differences on change detection analysis N84-30408
Quick look analysis of TM data of the Washington, District of Columbia area N84-30418
Study of Thematic Mapper and Multispectral Scanner data applications N84-30421
Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424
A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425
The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30426

IMAGE CONTRAST
The DFVLR contrast transmittance model SCOTRAN-program system: Description and operating instruction
[DFVLR-FB-84-18] N84-30589

IMAGE ENHANCEMENT
LANDSAT-4 radiometric and geometric correction and image enhancement results — San Francisco Bay, California N84-30370
Holographic image subtraction by recording in Fourier plane and space filtration with thin light beam
N84-30882

IMAGE PROCESSING
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1
[E84-10166] N84-30359
LANDSAT-4 system description N84-30361
Multispectral Scanner (MSS) instrument description
N84-30362
An overview of the Thematic Mapper geometric correction system N84-30367
Thematic Mapper Image Processing System (TIPS) processing status N84-30368
Thematic Mapper image production in the engineering checkout phase N84-30369
TM digital image products for applications
N84-30371
Pre-launch absolute radiometric calibration of LANDSAT-4 protoflight Thematic Mapper N84-30373
Revised radiometric calibration technique for LANDSAT-4 Thematic Mapper data by the Canada Centre for Remote Sensing N84-30378
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30380
LANDSAT-4 MSS and TM spectral class comparison and coherent noise analysis — The Des Moines, Iowa area N84-30381
Status of the ESA-Earthnet LANDSAT-4 TM ground processing chain N84-30391
The use of linear feature detection to investigate Thematic Mapper data performance and processing
N84-30393
Spatial resolution estimation of LANDSAT-4 TM data
N84-30394
Investigation of TM band-to-band registration using the JSC registration processor N84-30398
The effect of point-spread function interaction with radiance from heterogeneous scenes on multitemporal signature analysis — soybean stress N84-30400
Radiometric calibration and geocoded precision processing of LANDSAT-4 Multispectral Scanner products by the Canada Centre for Remote Sensing N84-30404
LANDSAT-4 MSS geometric correction: Methods and results N84-30409
Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413
An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414
A concept for the processing and display of Thematic Mapper data N84-30417
Final comparison of TM and MSS data for surface mine assessment in Logan County, West Virginia N84-30430
Earth Observing System. Science and mission requirements, volume 1, part 1
[NASA-TM-86129-VOL-1-PT-1] N84-30450
PRISM: A practical real-time imaging stereo matcher
[AD-A142532] N84-30686
Computational experiments with a feature based stereo algorithm
[AD-A142549] N84-30687
Nonlinear dynamics of multi-channel binocular vision
[AD-A142600] N84-30689
Three image compression algorithms for Compression and Decompression of Imaging Sensor Signals (CADISS)
[NLR-MP-83027-U] N84-30791
Smoothed local symmetries and their implementation
[AD-A142489] N84-30811

IMAGE RECONSTRUCTION
Holographic image subtraction by recording in Fourier plane and space filtration with thin light beam
N84-30882

IMAGE RESOLUTION
TM digital image products for applications
N84-30371

A preliminary assessment of LANDSAT-4 Thematic Mapper data N84-30377
A preliminary analysis of LANDSAT-4 Thematic Mapper radiometric performance N84-30379
An analysis of the high frequency vibrations in early Thematic Mapper scenes N84-30395
Tests of low-frequency geometric distortions in LANDSAT-4 images N84-30397
Investigation of radiometric properties of LANDSAT-4 MSS N84-30403
LANDSAT scene-to-scene registration accuracy assessment N84-30405
Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411
Preliminary evaluation of Thematic Mapper image data quality N84-30415
Comparison of the information content of data from the LANDSAT-4 Thematic Mapper and the Multispectral Scanner N84-30420
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429
Computational experiments with a feature based stereo algorithm
[AD-A142549] N84-30687

IMAGES
Smoothed local symmetries and their implementation
[AD-A142489] N84-30811
Intelligent optical design program
[DE84-010071] N84-30813

IMAGING TECHNIQUES
Selection of elements in process schemes on Cathode Ray Tube (CRT). A comparative study between four types of trackballs
[IZF-1984-4] N84-30213
An overview of LANDSAT-4 and the Thematic Mapper N84-30364
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30380
LANDSAT-4 Thematic Mapper calibration and atmospheric correction N84-30384
Calibration of TM data from ground-based measurements N84-30385
Intraband radiometric performance of the LANDSAT-4 Thematic Mapper N84-30389

IMMOBILIZATION
Dynamics of red blood cell changes in rats during acute immobilization N84-30651

IMMUNOLOGY
Hierarchial command, control and coupled bilinear systems
[AD-A142401] N84-30823

IMPACT DAMAGE
Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972

IMPACT TESTING MACHINES
A survey of biodynamic test devices and methods
[AD-A142467] N84-29894

IMPACT TESTS
Development of a high-pressure quasi-isentropic plane wave generating capability
[DE84-011619] N84-30348

IMPEDANCE MEASUREMENT
Application of electrochemical and mechanical impedance measurements to corrosion induced failures
[AD-A142468] N84-30021

IMPLOSIONS
Heating and implosion of spherical targets irradiated by laser N84-30879

IMPURITIES
Trace analysis in quartz
[AD-A142425] N84-29988
Rotation and impurity transport in a Tokamak plasma with directed neutral beam injection
[DE84-008014] N84-30996

INCLUSIONS
The effects of non-metallic inclusions in steel on fatigue properties N84-30070

INCOMPRESSIBLE FLUIDS
Calculation of the statistical characteristics of surface
[NASA-TM-77462] N84-30222

INCONEL (TRADEMARK)
Ring ductility of irradiated Inconel 706 and Nimonic PE16
[DE84-010397] N84-30034

INDEPENDENT VARIABLES
Lightning simulator circuit parameters and performance for severe-threat, high-action-integral testing
[DE84-009065] N84-30211

INDEXES
Information Center Complex publications and presentations, 1971-1982
[DE84-010603] N84-31055

INDEXES (DOCUMENTATION)
Index to NASA News Releases and Speeches, 1983
[NASA-TM-85509] N84-31047
Government acronyms and alphabetic organizational designations used in DTIC (Defense Technical Information Center)
[AD-A142700] N84-31049
Solar-geophysical data number 473. Part 1: (Prompt reports) data for December 1983, November 1983 and late data
[PB84-180611] N84-31073
Solar-geophysical data number 473. Part 2: (Comprehensive reports) data for July 1983, March 1981 and miscellanea
[PB84-180629] N84-31074

INDIAN OCEAN
An objective analysis technique for extrapolating tidal fields N84-30471

INDIUM COMPOUNDS
Low cost, sprayed CuInSe2 solar cell research
[DE84-010480] N84-30533

INDUSTRIAL MANAGEMENT
Science and technology report to the Congress, 1982
[DE84-901150] N84-31040

INDUSTRIAL PLANTS
Design philosophy for reliable systems, including control
[DE84-012681] N84-30814

INDUSTRIAL SAFETY
Chronic effects of repeated mechanical trauma to the skin: A description of the problem in the workplace
[PB84-181767] N84-30695

INDUSTRIAL WASTES
Determination of thermal-degradation rates of some candidate Rankine-cycle organic working fluids for conversion of industrial waste heat into power
[DE84-009585] N84-30304

INDUSTRIES
Seeding the Ada (trademark) software components industry
[AD-P003432] N84-30764

INELASTIC COLLISIONS
Measurements of integral state-specific cross sections of inelastic collisions between NO and noble gases
[MPIS-18/1983] N84-30935

INELASTIC SCATTERING
Pion elastic and inelastic scattering from (40) (42) (44) (48)Ca and (54)Fe
[DE84-009080] N84-30927

INELASTIC STRESS
Interactive computer analysis methods for predicting the inelastic cyclic behaviour of structural sections
[PB84-192012] N84-30358

INERTIA
Inertial and shear flow N84-30674

INERTIAL FUSION (REACTOR)
A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912

INFERENCE
Inference based on ranks with multiple failure time or grouped survival data
[MATHS-RES-177] N84-30324

INFILTRATION
Liquid metal infiltration of an aluminum alloy into a packed column of B4C particles
[DE84-012136] N84-30055

INFORMATION
The representation of part-whole information in memory
[PB84-180140] N84-30701

INFORMATION DISSEMINATION
Guidelines for the design of large modular scientific libraries in Ada
[CWI-NM-N8401] N84-30792
Technical assistance and information dissemination for the appropriate technology small grants program
[DE84-010957] N84-31042
Index to NASA News Releases and Speeches, 1983
[NASA-TM-85509] N84-31047
Defense Technical Information Center referral data bank directory
[AD-A138400] N84-31051
Information Center Complex publications and presentations, 1971-1982
[DE84-010603] N84-31055
Appropriate technology management information system
[DE84-010952] N84-31056
Solar Radiation Data Directory: A guide to solar radiation and meteorological data collection activities in the US
[DE84-000095] N84-31057

INFORMATION MANAGEMENT
Information processing for use in the treatment of severely physically handicapped persons N84-30711
The Optical Coincidence Information Retrieval system (OCIR)
[MPAE-L-66-84-10] N84-31059

INFORMATION RETRIEVAL
Communicating between the IBM personal computer and the Wang word processing system
[DE84-010423] N84-30729
Inductive information retrieval using parallel distributed computation
[AD-A142712] N84-31050
Defense Technical Information Center referral data bank directory
[AD-A138400] N84-31051
Common data input-retrieval system
[DE84-010972] N84-31053
The Optical Coincidence Information Retrieval system (OCIR)
[MPAE-L-66-84-10] N84-31059

INFORMATION SYSTEMS
Acoustical communications by means of small explosive charges
[DE84-008903] N84-30161
Earth Observing System, conclusions and recommendations N84-30454
Remote sensing and the private sector: Issues for discussion
[PB84-160777] N84-30520
Operator performance on flat-panel displays with line and cell failures
[AD-A142340] N84-30716
Guidelines for contingency planning NASA (National Aeronautics and Space Administration) ADP security risk reduction decision studies
[PB84-189836] N84-30737
Information Center Complex publications and presentations, 1971-1982
[DE84-010603] N84-31055
Appropriate technology management information system
[DE84-010952] N84-31056
The Optical Coincidence Information Retrieval system (OCIR)
[MPAE-L-66-84-10] N84-31059

INFORMATION THEORY
Policy implications of information technology
[PB84-183219] N84-31060

INFRARED ABSORPTION
Trace constituents measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86285] N84-30566

INFRARED ASTRONOMY
Activities in astronomy
[ISSN-0531-4496] N84-31067

INFRARED DETECTORS
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder
[NOAA-TM-NESDIS-6] N84-30571

INFRARED LASERS
CO2 gamma 3 fundamental band 4.5 micrometers laser potential
[AD-A142536] N84-29991

INFRARED RADIOMETERS
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder
[NOAA-TM-NESDIS-6] N84-30571

INFRARED REFLECTION
Evaluation of the radiometric integrity of LANDSAT-4 Thematic Mapper band 6 data N84-30375
Thermal band characterization of LANDSAT-4 Thematic Mapper — Buffalo, New York and water temperature in Lake Erie N84-30376

INFRARED SPECTRA
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86285] N84-30566

INFRARED SPECTROMETERS
Trace constituents measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565

INFRARED SPECTROSCOPY
Investigation of laser induced radical reactions using time resolved infrared and coherent anti-Stokes Raman scattering (CARS) spectroscopy
[MPIS-17/1983] N84-30006

INFRARED TELESCOPES
Support structures for large infrared telescopes
[NASA-CR-3800] N84-30328

INHOMOGENEITY
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas
[DE84-012396] N84-31002
INJECTION MOLDING
The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings
[MRL-R-924] N84-30332
INJECTORS
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
Techniques for fatigue life predictions from measured strains
[NASA-CR-171118] N84-30334
INJURIES
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868
INLAND WATERS
SEASAT altimetry for surface height of inland seas
N84-30472
INPUT/OUTPUT ROUTINES
Report on functional design specification for the automated alphanumeric data entry system
[AD-A142518] N84-30725
Common data input-retrieval system
[DE84-010972] N84-31053
INSERTION LOSS
Propagation loss in electrostatically variable SAW delay lines
[AD-A142433] N84-30183
INSPECTION
Qualifications of ultrasonic testing for nuclear inservice inspection applications
[DE84-011899] N84-30323
INSTRUCTORS
The CECOM summer faculty research program
[AD-P003421] N84-30753
Operating system interface for Ada (trademark) instructors
[AD-P003433] N84-30765
INSTRUMENT FLIGHT RULES
FAA (Federal Aviation Administration) air traffic activity FY 1983
[AD-A142493] N84-29861
INSULATION
HgCdTe surface and defect study program
[AD-A142342] N84-31010
INTAKE SYSTEMS
Air Force Academy Aeronautics Digest
[AD-A142399] N84-29849
INTEGRALS
An integral prediction method for three-dimensional flow separation
[AD-A142551] N84-30231
INTEGRATED CIRCUITS
MMIC technology for advanced space communications systems
[NASA-TM-83749] N84-30147
Modeling and extraction of interconnect parameters in very-large-scale integrated circuits
[AD-A142361] N84-30182
Gate arrays — integrated circuits
[AD-B082958] N84-30214
INTENSITY
Fundamental and harmonic emission in interplanetary type 2 radio bursts
[NASA-TM-86099] N84-31079
INTERACTIVE CONTROL
An assessment of interactive graphics processing in short-range terminal weather forecasting
[AD-A142706] N84-30601
INTERCONTINENTAL BALLISTIC MISSILES
A turbomechanical thrust vector control for advanced intercontinental ballistic missiles N84-29953
INTERFACES
Surface-enhanced Raman spectroscopy of electrochemically characterized interfaces. Transition-metal isothiocyanate adsorbates at silver adsorbates
[AD-A142407] N84-29986
Experience with Ada (trademark) for the Graphical Kernel System
[AD-P003426] N84-30758
Operating system interface for Ada (trademark) instructors
[AD-P003433] N84-30765
Graphics language, version 2.2
[AD-A142438] N84-30772
INTERFACIAL ENERGY
HgCdTe surface and defect study program
[AD-A142342] N84-31010
INTERFERENCE DRAG
Interference drag in a simulated wing-fuselage juncture
[NASA-CR-3811] N84-29853
INTERFEROMETERS
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer
N84-30865
INTERGRANULAR CORROSION
Solving corrosion problems with surface analysis
[DE84-008652] N84-30025
INTERMETALLICS
Improved oxidation sulfidation resistance of Fe-Cr-Ni alloys
[DE84-010066] N84-30039
Liquid metal infiltration of an aluminum alloy into a packed column of B4C particles
[DE84-012138] N84-30055
INTERMITTENCY
Progress in the development of an intermittency model of turbulence
[CFD/83/7] N84-30255
Prediction of the temperature characteristics in intermittent, free turbulent shear layers
[CFD/84/1] N84-30256
INTERNATIONAL COOPERATION
Earth Observing System, conclusions and recommendations N84-30454
INTERNATIONAL SUN EARTH EXPLORERS
Some contributions to knowledge of the magnetospheric plasma by ISEE investigators
[NASA-TM-86124] N84-30962
INTERPLANETARY MAGNETIC FIELDS
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
INTERPLANETARY MEDIUM
Solar-geophysical data number 473. Part 2: (Comprehensive reports) data for July 1983, March 1981 and miscellanea
[PB84-180629] N84-31074
INTERPOLATION
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157
An objective analysis technique for extrapolating tidal fields N84-30471
INTERPROCESSOR COMMUNICATION
An Ada (trademark) network: A real-time distributed computer system
[AD-P003423] N84-30755
Augmenting computer networks
[NASA-CR-172399] N84-30800
Design issues in parallel architectures for artificial intelligence
[AD-A142482] N84-30809
INTERSTELLAR MATTER
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069
INTERSTELLAR SPACE
Studies of X-ray clusters of galaxies/intergalactic plasmas
[NASA-CR-173825] N84-31068
INVARIANCE
A nonstandard construction of Levy Brownian motion
[REPT-82] N84-30661
INVENTORIES
Inventory RF radiation levels in the Netherlands, part 1
[LEOK-TR-1984-02-PT-1] N84-30167
Inventory of geothermal resources in Nebraska
[DE84-009679] N84-30518
INVERSE SCATTERING
Inverse scattering problem
[AD-A142634] N84-30894
INVERSIONS
Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994
IODINE
Photoionization investigation of iodine molecules and clusters in a supersonic molecular beam
[AD-A142645] N84-30901
ION BEAMS
Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4
[DE84-012336] N84-30052
Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy
[DE84-012111] N84-30053
A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912
Accelerator-based atomic physics experiments with photon and ion beams
[DE84-010789] N84-30928
Calculation of ballistic focusing of ion beams
[DE84-012870] N84-30934
Transverse field focused system
[DE84-011070] N84-30942
ION CYCLOTRON RADIATION
Theoretical studies of Elma Bumpy Torus (EBT)
[DE84-010814] N84-30978
Density variation due to wave heating in Tokamak plasmas
[DE84-008402] N84-30993
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010842] N84-30999
ION DISTRIBUTION
Theoretical studies of Elma Bumpy Torus (EBT)
[DE84-010814] N84-30978
ION ENGINES
Tracking and Data Relay Satellite launch recovery mission N84-29918
ION IMPLANTATION
Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4
[DE84-012336] N84-30052
Diffusion and electrical properties of sulfur implanted in gallium arsenide
[AD-A142405] N84-31012
ION SOURCES
Electron emitting filaments for electron discharge devices
[DE84-011088] N84-30201
Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918
ION TEMPERATURE
Investigation of laminar shocks
[DE84-010074] N84-30582
IONIC COLLISIONS
Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30980
IONIC DIFFUSION
Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30980
IONIC REACTIONS
Solvent, ligand, and ionic charge effects on reaction entropies for simple transition-metal redox couples
[AD-A142374] N84-29984
IONIZATION
A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30568
Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922
IONIZED GASES
The gas-heating phase in electrical breakdown
[AD-A141961] N84-30967
IONIZING RADIATION
Instrumentation for nonionizing radiation measurement
[PB84-180603] N84-30271
IONOSPHERE
Evolution of structure in the PLACES barium clouds
[DE84-010996] N84-30583
IONOSPHERIC DISTURBANCES
High-latitude ionospheric irregularities
[AD-A142648] N84-30573
IONOSPHERIC HEATING
Soliton collapse during ionospheric heating
[DE84-009994] N84-30576
First observations of 140 MHz plasma line backscatter during healthy experiments at Tromsoe
[UIO-SR-84-02] N84-30588
IONOSPHERIC PROPAGATION
High-latitude ionospheric irregularities
[AD-A142648] N84-30573
IONS
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29981
The transfer of atoms, ions and molecular groups in solution. Part 2: · Tunnelling between harmonic wells
[AD-A142334] N84-29982

IOWA
LANDSAT-4 MSS and TM spectral class comparison and coherent noise analysis — The Des Moines, Iowa area N84-30381
Preliminary evaluation of Thematic Mapper image data quality N84-30415
IRON ALLOYS
Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy [DE84-011458] N84-30028
Improved oxidation sulfidation resistance of Fe-Cr-Ni alloys [DE84-010066] N84-30039
Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti [DE84-005411] N84-30043
Creep-fatique and temperature synergisms in alloy 800 [DE84-010131] N84-30046
Explosion parameters of ferroalloy dusts [BLL-M-35571-(5828.4)] N84-30102
IRON COMPOUNDS
Iron nitrate and MON-3 nitrogen tetroxide N84-29909
A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919
Electrostatic filtration of N2O4 for removal of solid and vapor contaminants N84-29922
IRON ISOTOPES
Pion elastic and inelastic scattering from (40) (42) (44) (48)Ca and (54)Fe [DE84-009060] N84-30927
IRON OXIDES
Photoelectrochemistry at iron oxide electrodes [DE84-011453] N84-30003
Investigation of the role of sintering in gas-solid interactions [DE84-010662] N84-30089
Cation self-diffusion in Fe2C3 [DE84-009152] N84-31025
IRRADIANCE
The NOAA-ERL-ARL solar UV radiation and climate research project program description [PB84-183292] N84-31070
IRRADIATION
Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy [DE84-012111] N84-30053
Ceramics for fusion devices [DE84-011409] N84-30082
Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657
Biological effects of millimeter-wave irradiation: Living bacterial organisms [AD-A142474] N84-30670
Preliminary result of our new Nationwide Evaluation of X-ray Trends (NEXT) program for Italy [ISS-L-84/3] N84-30693
Dynamics of plasma corona on spherical targets irradiated by laser N84-30678
Heating and implosion of spherical targets irradiated by laser N84-30679
ISOLATORS
A study of distributed millimeter-wave isolators [AD-A142729] N84-30189
ISOTROPY
Nonlocal heat transport by non-Maxwellian electrons [DE84-012391] N84-31000
ITALY
Preliminary result of our new Nationwide Evaluation of X-ray Trends (NEXT) program for Italy [ISS-L-84/3] N84-30693
ITERATION
Ada (trademark) tasking in numerical analysis [AD-P003429] N84-30761
Modifications to iterative recursion unfolding algorithms and computer codes to find more appropriate neutron spectra [AD-A142475] N84-30775
ITERATIVE SOLUTION
Optimization of a numerical method to calculate elliptic flows [DFVLR-FB-84-16] N84-30252

J

J INTEGRAL
J-integral tearing instability analysis for 8-inch diameter ASTM A106 steel pipe [AD-A142589] N84-30023
JAMMING
List metric detection of coded FH/MFSK (Frequency-Hopped Multiple Frequency Shift Keying) in a tone jamming environment [AD-A142358] N84-30153
JAPAN
Report of the geomagnetic and geoelectric observations, 1982 (rapid variations) [KMO-23] N84-30567
Derivation of crustal magnetic anomalies from MAGSAT [REPT-609] N84-30569
JAPANESE SPACE PROGRAM
Proceedings of the Symposium on Mechanics for Space Flight [ISAS-SP-2] N84-30114
JET ENGINE FUELS
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets N84-29963
Aviation fuels, 1983 [DE84-011823] N84-30106
JET ENGINES
Cost/risk analysis for disk retirement, volume 1 [AD-A141978] N84-29881
A data acquisition and real-time display system for testing a jet engine compressor [AD-A142696] N84-30301
JET EXHAUST
Analysis of particulates in the exhaust plume of a TF30 engine at military power [AD-A142510] N84-29882
JET FLOW
A theoretical and experimental study of turbulent nonevaporating sprays [NASA-CR-174668] N84-29877
JOINTS (JUNCTIONS)
Joining silicon nitride based ceramics: A technical assessment [DE84-011356] N84-30092
Effects of bond deterioration on hysteretic behavior of reinforced concrete joints [PB84-192020] N84-30343
System identification of structures with joint rotation [PB84-192210] N84-30357
JP-5 JET FUEL
The toxicity of petroleum and shale JP5 [AD-A142670] N84-30690

K

KANSAS
Study of Thematic Mapper and Multispectral Scanner data applications N84-30421
KEVLAR (TRADEMARK)
Characterization of filament wound Kevlar and glass composites for rocket motor applications N84-29949
Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954
KINEMATICS
A model of the shoulder girdle for use in rehabilitation N84-30710
KINETIC EQUATIONS
Rotation and impurity transport in a Tokamak plasma with directed neutral beam injection [DE84-008014] N84-30996
KINETICS
Kinetic processes in high pressure gases. Excited state collisions [AD-A141927] N84-30016
Geokinetic effects on motion sensitive instrumentation, systems and facilities [AD-A142682] N84-30575
KLYSTRONS
Klystron voltage pulse timing experiment [DE84-011753] N84-30176
Analytic solution for the problem of gridded gap-electron flow interaction [DE84-008975] N84-30209
KRYPTON
Resonance ionization spectroscopy of argon, krypton and xenon using vacuum ultraviolet light [DE84-011655] N84-30006

L

L-1011 AIRCRAFT
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970
LABORATORY EQUIPMENT
Strategies for analytical applications and implementation of a multi-purpose laboratory robot [DE84-012379] N84-30314
LAGEOS (SATELLITE)
Update: San Andreas Fault experiment N84-30458
A comparison between Lageos laser ranging and VLBI determined baselines N84-30459
Lageos orbit and the albedo problem N84-30464
Lageos orbit and solar eclipses N84-30465
Verification of the accuracy of GEM-L2 in response to criticism by Lambeck and Coleman N84-30466
LAKES
A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425
LAMINAR FLOW
Investigation of laminar shocks [DE84-010074] N84-30582
LAMINATES
Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972
Impact dynamics research on composite transport structures N84-29975
A study of stiffness, residual strength and fatigue life relationships for composite laminates [NASA-CR-172211] N84-29978
LAND ICE
Polar glaciology N84-30445
LAND USE
A preliminary assessment of LANDSAT-4 Thematic Mapper data N84-30377
Impact of Thematic Mapper sensor characteristics on classification accuracy N84-30410
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429
Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications N84-30431
Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory N84-30432
Wetlands: Their use and regulation [PB84-175918] N84-30561
Debris Flows, Landslides, and Floods in the San Francisco Bay Region, January 1982: Overview and summary of a conference [PB84-194737] N84-30590
LANDAU DAMPING
Linear theory of lower hybrid heating [DE84-010577] N84-30979
LANDING
Simulator evaluation of a remotely piloted vehicle lateral landing task using a visual display [NASA-TM-85903] N84-29885
LANDSAT SATELLITES
Impact of LANDSAT MSS sensor differences on change detection analysis N84-30406
Forest environments N84-30439
Geology N84-30442
Earth Observing System, introduction N84-30451
The effect of spatial, spectral and radiometric factors on classification accuracy using thematic mapper data [NASA-TM-85995] N84-30510
LANDSAT 4
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1 [E84-10166] N84-30359
The LANDSAT-4 program: An overview N84-30360
LANDSAT-4 system description N84-30361
An overview of LANDSAT-4 and the Thematic Mapper N84-30364
Thematic Mapper Image Processing System (TIPS) processing status N84-30368
Thematic Mapper image production in the engineering checkout phase N84-30369
LANDSAT-4 radiometric and geometric correction and image enhancement results — San Francisco Bay, California N84-30370
TM digital image products for applications N84-30371
Spectral characterization of the LANDSAT Thematic Mapper sensors N84-30372
Pre-launch absolute radiometric calibration of LANDSAT-4 protoflight Thematic Mapper N84-30373
Relative radiometric calibration of LANDSAT TM reflective bands — San Francisco, California N84-30374
Evaluation of the radiometric integrity of LANDSAT-4 Thematic Mapper band 6 data N84-30375
A preliminary assessment of LANDSAT-4 Thematic Mapper data N84-30377
Revised radiometric calibration technique for LANDSAT-4 Thematic Mapper data by the Canada Centre for Remote Sensing N84-30378
A preliminary analysis of LANDSAT-4 Thematic Mapper radiometric performance N84-30379
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2 [E84-10167] N84-30380
Tests of low-frequency geometric distortions in LANDSAT-4 images N84-30397
Geodetic accuracy of LANDSAT-4 Multispectral Scanner and Thematic Mapper data N84-30399

Radiometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) data — Vermont N84-30401

Spectral characterization of the LANDSAT-4 MSS sensors N84-30402

Investigation of radiometric properties of LANDSAT-4 MSS N84-30403

Radiometric calibration and geocoded precision processing of LANDSAT-4 Multispectral Scanner products by the Canada Centre for Remote Sensing N84-30404

Geometric accuracy of LANDSAT-4 MSS image data — Georgia N84-30406

Geometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) — Washington, D.C. N84-30407

LANDSAT-4 MSS geometric correction: Methods and results N84-30409

Impact of Thematic Mapper sensor characteristics on classification accuracy N84-30410

Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411

Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results — Death Valley, California, Cement-Velma, Oklahoma; Big Horn and Wind River Basins, Wyoming; Spanish Peaks, Colorado; and the Four Corners area (Paradox Basin of Utah and Colorado) N84-30412

Preliminary evaluation of Thematic Mapper image data quality N84-30415

Quick look analysis of TM data of the Washington, District of Columbia area N84-30418

Comparison of the information content of data from the LANDSAT-4 Thematic Mapper and the Multispectral Scanner N84-30420

Study of Thematic Mapper and Multispectral Scanner data applications N84-30421

Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422

Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423

The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30428

Final comparison of TM and MSS data for surface mine assessment in Logan County, West Virginia N84-30430

Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications N84-30431

Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory N84-30432

LAPLACE TRANSFORMATION

A Taylor series in symmetry-adaptable functions [AD-A142336] N84-30819

LARGE SCALE INTEGRATION

Modeling and extraction of interconnect parameters in very-large-scale integrated circuits [AD-A142381] N84-30182

Proton-induced single event upsets in the SBP9989 microprocessor [AD-A142448] N84-30724

LARGE SPACE STRUCTURES

Support structures for large infrared telescopes [NASA-CR-3800] N84-30328

Multi-100kW: Planar low cost solar array development [NASA-CR-171119] N84-30529

A numerical algorithm for chained aggregation and modified chained aggregation [AD-A142394] N84-30822

LARMOR RADIUS

Interaction of the processional wave with free-boundary Alfven surface waves in tandem mirrors [DE84-012527] N84-31003

LASER APPLICATIONS

UV laser triggering of crowbars used in the Sandia lightning simulator [DE84-009064] N84-30199

Bibliography of Soviet laser developments, number 64, March -April 1983 [AD-A141906] N84-30275

Free electron lasers and related topics [DE84-011332] N84-30277

Application of FASTRAK by Skandinavisk Autodigitaliserings AB (SADAB) cartographic service N84-30496

Characterization of micron-sized, optical coating defects by photothermal deflection microscopy [DE84-011150] N84-30960

LASER DAMAGE

Guidelines for running the thermal computational model of the eye [AD-A142550] N84-30688

LASER FUSION

Reflex ring laser amplifier system [DE84-010674] N84-30282

Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30881

LASER HEATING

Experiments and theory on half-harmonic light and 2-plasmon decay [DE84-008945] N84-30276

Heating and implosion of spherical targets irradiated by laser N84-30879

Plasma simulation studies of electron acceleration for beat wave and single frequency-laser heating schemes [DE84-009968] N84-30992

LASER INTERFEROMETRY

A new optical technique for rapid determination of creep and fatigue thresholds at high temperature [AD-A142675] N84-30341

Holographic image subtraction by recording in Fourier plane and space filtration with thin light beam N84-30882

LASER MATERIALS

Bibliography of Soviet laser developments, number 64, March -April 1983 [AD-A141906] N84-30275

LASER OUTPUTS

Experiments and theory on half-harmonic light and 2-plasmon decay [DE84-008945] N84-30276

Capillary separations with calorimetric absorbance detection [DE84-012466] N84-30291

New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30866

Impact of laser radiation on optical properties of polymer liquid crystal in phase transition range N84-30888

LASER PLASMAS

Holographic interferometry using 20-picosecond UV pulses to obtain time resolved hydro measurements of selenium and gold plasmas [DE84-009485] N84-30269

A convective mechanism for inhibition of heat conduction in laser produced plasmas [DE84-011336] N84-30289

VUV instrument calibrations for laser-plasma studies [DE84-010507] N84-30974

Measurements of spatially resolved high resolution spectra of laser-produced plasmas [DE84-012418] N84-30995

Observation of scattered light between Omega-2 and 3/2-Omega in short wavelength laser produced plasmas [DE84-012533] N84-31001

Studies of CO2 laser interactions with plasma [DE84-012485] N84-31004

A new model of Raman spectra in laser produced plasma [DE84-012487] N84-31005

LASER PUMPING

Theoretcial studies of solar-pumped lasers [NASA-CR-173833] N84-30274

LASER RANGE FINDERS

A comparison between Lageos laser ranging and VLBI determined baselines N84-30459

Sensitivity of SLR baselines to errors in Earth orientation N84-30461

Recommended program activities, 1988-1998 N84-30478

LASER RANGER/TRACKER

Results of laser ranging collocations during 1983 N84-30458

LASER SPECTROSCOPY

Investigation of laser induced radical reactions using time resolved infrared and coherent anti-Stokes Raman scattering (CARS) spectroscopy [MPIS-17/1983] N84-30006

The blue-green spectrum of gaseous Pb2 wave numbers and constants of the FOu+ - XOg+ system [USIP-84-06] N84-30009

Detection of NH-2O-radicals by far-infrared laser magnetic resonance spectroscopy [MPIS-6/1984] N84-30010

Resonance absorption of narrow-band laser radiation by atmospheric gases N84-30493

LASER TARGET INTERACTIONS

Heating and implosion of spherical targets irradiated by laser N84-30879

LASER TARGETS

Experiments and theory on half-harmonic light and 2-plasmon decay [DE84-008945] N84-30276

Measurements of high resolution spectra on the Omega laser at Rochester University [DE84-012419] N84-30290

Heating and implosion of spherical targets irradiated by laser N84-30879

Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30881

Measurements of spatially resolved high resolution spectra of laser-produced plasmas [DE84-012418] N84-30995

LASER WELDING

A study of the dependence of microsegregation on critical solidification parameters in rapidly-quenched structures [AD-A142293] N84-30019

A users manual for the laser welding code WELD2D [DE84-011167] N84-30306

LASERS

Bibliography of Soviet laser developments, number 64, March -April 1983 [AD-A141906] N84-30275

USSR report: Physics and mathematics [JPRS-UPM-84-001] N84-30862

Dynamics of plasma corona on spherical targets irradiated by laser N84-30878

Control computer and automation subsystem equipment in Delfin Facility N84-30880

LASING

CO2 gamma 3 fundamental band 4.5 micrometers laser potential [AD-A142536] N84-29991

LATITUDE

A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images [AD-A142019] N84-30512

LATTICES

Strained layer superlattice materials for millimeter wave FET's, phase 1 [DE84-011475] N84-31007

LATTICES (MATHEMATICS)

Some negative results for avoiding lattice fermionic doubling [PREPRINT-358] N84-30938

LAUNCH VEHICLES

A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems [AD-A141136] N84-29898

Propulsion options for orbit-on-demand N84-29915

Development and fabrication of a graphite/epoxy motor case for air launch missile applications N84-29948

LAUNCHING

Wind tunnel tests on a tube-launched missile configuration with a deflectable nose control and a novel wrap-around fin stabiliser [AD-A142082] N84-29900

LAVA

Chemical evolution of a high-level magma system: The Black Mountain Volcanic Center, Southern Nevada [DE84-013321] N84-30587

LEACHING

Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review [DE84-009432] N84-30557

LEAD (METAL)

The blue-green spectrum of gaseous Pb2 wave numbers and constants of the FOu+ - XOg+ system [USIP-84-06] N84-30009

LEAD ACID BATTERIES

Testing, data analysis and engineering services on lead-acid load leveling batteries [DE84-011523] N84-30198

Battery test results on Gould GC2-EV200 [DE84-900635] N84-30208

EValuation of a 96V EV 1000 battery pack at temperature extremes [PB84-187723] N84-30217

Evaluation of an 96V ALCO 2200 battery pack at temperature extremes [PB84-187731] N84-30219

The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery [PB84-184894] N84-30550

LEAD TITANATES

Lead zirconate-lead titanate (PZT) ceramics from organic-derived precursors [DE84-009921] N84-30095

LEADERSHIP

A model of inter-organizational influences on organizational processes [AD-A142450] N84-31037

LEAKAGE

Improved gaseous leak detector [DE84-011295] N84-30265

Vapor spill pipe monitor [DE84-011103] N84-30267

Measurement techniques for high-power semiconductor materials and devices' [DE84-010425] N84-31016

LEARNING
Learning the Ada (trademark) integrated environment
[AD-P003417] N84-30749
LEGENDRE FUNCTIONS
Legendre-tau approximation for functional differential equations. Part 2: The linear quadratic optimal control problem
[NASA-CR-172397] N84-30618
LENGTH
Research and development of long heat pipes and their applications — heating road surfaces on bridges
N84-30126
LEUKOCYTES
Dependence of blood coagulating and fibrinolytic systems on functional state of lysosomal system of neutrophil leukocytes during exposure of the body to low barometric pressure N84-30661
LEVELING
Testing, data analysis and engineering services on lead-acid load leveling batteries
[DE84-011523] N84-30198
LEXAN (TRADEMARK)
The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings
[MRL-R-924] N84-30332
LIAPUNOV FUNCTIONS
Lyapunov stability conditions for a relativistic multifluid plasma
[DE84-010004] N84-30973
LIBRARIES
SLATEC mathematical subprogram library, version 2.0
[DE84-010750] N84-30782
LIFE (DURABILITY)
Durability methods development, volume 7
[AD-A142400] N84-29665
LIFE CYCLE COSTS
Cost/risk analysis for disk retirement, volume 1
[AD-A141978] N84-29881
Cost evaluation of space station propulsion system options N84-29932
Network repair level analysis model user's guide
[AD-A141991] N84-30743
Improving system affordability
[AD-A142387] N84-31062
LIFT DEVICES
Surface disturbances due to trailing vortices
[AD-A142693] N84-30233
LIGANDS
Solvent, ligand, and ionic charge effects on reaction entropies for simple transition-metal redox couples
[AD-A142374] N84-29984
Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions
[AD-A142483] N84-29990
LIGHT (VISIBLE RADIATION)
Excitation of sound by light N84-30863
Switchable zero order diffraction gratings as light valves
[AD-A142513] N84-30953
LIGHT AIRCRAFT
Experimental study of noise transmission into a general aviation aircraft
[NASA-CR-172357] N84-30888
LIGHT TRANSMISSION
Resonance absorption of narrow-band laser radiation by atmospheric gases N84-30493
Interpreting spectra of sea surface aerial photographs
N84-30494
Analytic techniques for estimating visible image transmission properties of the atmosphere
[AD-A142524] N84-30954
Electrochromic materials for the regulation of solar energy transmission through windows
[DE84-012165] N84-31029
LIGHT VALVES
Switchable zero order diffraction gratings as light valves
[AD-A142513] N84-30953
LIGHT WATER REACTORS
Calculation of crack behaviour on exposure to thermal shock
[BLL-RISLEY-TR-4941-(9091.9F)] N84-30326
LIGHTNING
UV laser triggering of crowbars used in the Sandia lightning simulator
[DE84-009064] N84-30199
Lightning simulator circuit parameters and performance for severe-threat, high-action-integral testing
[DE84-009065] N84-30211
Comparison of lightning flash rates from the PBE sensor and streak counting from the DMSP satellite
[DE84-006722] N84-30602
LIMITERS (FUSION REACTORS)
Graphite-ceramic RF Faraday-thermal shield and plasma limiter
[DE84-010960] N84-30086
Lower hybrid experiments at the 1 MW level on Alcator C: Heating and current drive
[DE84-010586] N84-30981
The use of isotopically-enriched carbon probes for erosion deposition measurements in the ASDEX divertor
[DE84-012329] N84-31006
LINE SHAPE
Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994
LINE SPECTRA
Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994
Rare-earth ion-host lattice interactions: 15. Analysis of the spectra of Nd3+ in Gd3Sc2Ga3O12
[AD-A142555] N84-31015
LINEAR ACCELERATORS
Practical aspects of tuning a ringed RFQ
[DE84-011368] N84-30163
High-current, low-energy synchrotrons and compressor rings
[DE84-012104] N84-30906
Making electron beams for SLC linac
[DE84-012072] N84-30907
New directions in linear accelerators
[DE84-011412] N84-30911
Elementary principles of linear accelerators
[DE84-007911] N84-30913
Temperature rise calculations for the beam pipe in the SLC arcs
[DE84-011764] N84-30924
Simulation of ultra-low emittance electron storage rings
[DE84-012050] N84-31024
LINEAR AMPLIFIERS
Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30881
LINEAR EQUATIONS
Analysis and control of a class of stiff linear distributed systems
[AD-A142364] N84-30821
LINEAR PROGRAMMING
Linear systems analysis program user's manual, version 2.2 (VAX/VMS)
[DE84-012230] N84-30789
A problem expanding parametric programming method for solving the job shop scheduling problem
[AD-A142392] N84-31036
LINEAR SYSTEMS
Control systems design for linear dynamic systems using simple models: Some case studies. Part 1: The single-input/single-output case
[RR-247-PT-1] N84-30134
A simulation technique for checking the circle criterion — linear systems stability
[RR-248] N84-30733
Linear systems analysis program user's manual, version 2.2 (VAX/VMS)
[DE84-012230] N84-30789
Analysis and control of a class of stiff linear distributed systems
[AD-A142364] N84-30821
Hierarchial command, control and coupled bilinear systems
[AD-A142401] N84-30823
State estimation and control of conditionally linear systems
[AD-A142455] N84-30826
Techniques for large sparse systems arising from continuation methods
[DE84-010410] N84-30833
Linear systems analysis program: Programmer's manual, version 2.2 (VAX/VMS)
[DE84-010953] N84-30835
Linear structures in bilinear systems
[RR-250] N84-30852
LINEARITY
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30892
Reactive resonance and angular distributions in the rotating linear model
[DE84-011354] N84-30919
LINES (GEOMETRY)
COMEDG: A program to combine logically independent line segments into geometrically coherent lines
N84-30499
LININGS
Shock wave absorber having a deformable liner
[DE84-011308] N84-30243
LINKAGES
Design considerations for shear links in eccentrically braced frames
[PB84-192186] N84-30136
LINKS
Serial link protocol design: A critique of the X.25 standard, level 2
[DE84-002724] N84-30806
LIQUEFIED NATURAL GAS
Vapor spill pipe monitor
[DE84-011103] N84-30267
LIQUID ATOMIZATION
Atomization of liquid sheets in high pressure airflow
[NASA-TM-83731] N84-30223
LIQUID COOLING
Resonance in the water circuit of a cooling tower
[S/T-REPT-VOL-1-NO-2] N84-30254
LIQUID CRYSTALS
Impact of laser radiation on optical properties of polymer liquid crystal in phase transition range N84-30868
LIQUID HELIUM 2
Experimental study on porous-plug phase separator for superfluid He2
[ISAS-612] N84-31008
LIQUID HYDROGEN
An integrated space station propulsion system
N84-29933
LIQUID METAL COOLED REACTORS
Liquid metal breeder-coolant blanket concept
[DE84-006554] N84-30971
LIQUID METALS
Liquid metal infiltration of an aluminum alloy into a packed column of B4C particles
[DE84-012136] N84-30055
An MPD thruster with liquid metal injection
[ISAS-610] N84-30103
LIQUID OXYGEN
LOX/CH4 for reusable high performance booster engines N84-29926
High pressure LOX/natural gas staged combustion technology N84-29927
An integrated space station propulsion system
N84-29933
LIQUID PHASES
Atmospheric chemistry of H2O2, NO3, HONO, and HNO3: Influence of aqueous phase and heterogeneous processes
[PB84-183680] N84-30592
LIQUID PROPELLANT ROCKET ENGINES
The 1984 JANNAF Propulsion Meeting, volume 1
[AD-A142852] N84-29908
LIQUID ROCKET PROPELLANTS
Dual mode propulsion system engine testing for INTELSAT N84-29913
LOX/CH4 for reusable high performance booster engines N84-29926
The liquid bipropellant stage concept: Filling the OTV gap N84-29936
LIQUID SURFACES
Invariance of level of rotating liquid
[BLL-M-35611-(5828.4)] N84-30220
LIQUIDS
Definition of the concentration gradient above flammable liquids
[DE84-008296] N84-29996
LITERATURE
Selected bibliography of solar thermal literature. Volume 1: Bibliography
[DE84-011386] N84-31052
LITHIUM
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29961
Quality control analysis of TA-23 glass seals for lithium ambient temperature batteries
[DE84-011719] N84-30094
LITHIUM CHLORIDES
Open cycle lithium chloride cooling system
[DE84-005831] N84-30234
LITHOLOGY
Analysis of LANDSAT-4 TM data for lithologic and image mapping purpose N84-30390
LITHOSPHERE
SEASAT observations of lithospheric flexure
N84-30463
LOAD TESTS
A study of stiffness, residual strength and fatigue life relationships for composite laminates
[NASA-CR-172211] N84-29978
LOADING RATE
Elastic-plastic deformation of pulse-loaded structures
[AD-A142350] N84-30339
LOADS (FORCES)
Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954

Operation and calibration of the Wincharger 450 model SWECS
[DE84-009757] N84-30546
Battery Energy Storage Test (BEST) facility
[DE84-012127] N84-30548
Biasing and fast degaussing circuit for magnetic materials
[DE84-011281] N84-30857

LOGIC CIRCUITS
Lightning simulator circuit parameters and performance for severe-threat, high-action-integral testing
[DE84-009065] N84-30211
Nonlinear real-time optical signal processing
[AD-A142619] N84-30956

LOGIC DESIGN
Logic machine architecture inference mechanisms: Layer 2 user reference manual release 2.0
[DE84-012115] N84-30726

LONG DURATION SPACE FLIGHT
Effect of living conditions in confined space on formation of bacterial aerosol N84-30659

LONG TERM EFFECTS
Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970
Land biology N84-30440
Effect of high ammonia content in pressure chamber atmosphere on human adrenocortical system function N84-30658

LONG WAVE RADIATION
Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680

LONGITUDE
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512

LOOP ANTENNAS
An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array
[AD-A142478] N84-30159
Finite-element-analysis of fields radiated from ICRF antenna
[IPPJ-675] N84-30965

LOSSES
Numerical and analytical studies of steady detonation waves with expansion losses
[AD-A142601] N84-30232

LOSSY MEDIA
Wave attenuation and mode dispersion in a waveguide coated with lossy dielectric material
[NASA-CR-173820] N84-30145

LOW COST
Advanced battery development in the US
[DE84-010505] N84-30190

LOW DENSITY MATERIALS
Crystalline-state extrusion of low density polyethylenes
[AD-A142017] N84-30075

LOW FREQUENCIES
Effect of constant and low-frequency magnetic fields on biological systems N84-30679

LOW SPEED
Flight characteristics of a manned, low-speed, controlled deep stall vehicle
[NASA-TM-86041] N84-29863
Friction in low speed lubricated rolling and sliding contacts
[VTT-16] N84-30318

LOW THRUST
Low thrust bipropellant engine development N84-29912

LOWER BODY NEGATIVE PRESSURE
Simulation of physiological effects of negative pressure on man N84-30662

LUBRICANT TESTS
High-temperature lubricants for minimum-cooled diesel engines
[AD-A142426] N84-30078

LUBRICANTS
Transmission efficiency measurements and correlations with physical characteristics of the lubricant
[NASA-TM-83740] N84-30293

LUBRICATING OILS
Thickener/fluid interaction in lubricating greases
[AD-A142276] N84-30076

LUBRICATION
Friction in low speed lubricated rolling and sliding contacts
[VTT-16] N84-30318

LUMINANCE
The present status of Clean PAL systems
[BBC-RD-1984/6] N84-30142

LUMINESCENCE
Polarization of paraexciton luminescence in Cu2O crystals in magnetic field N84-30670

LUMINOSITY
Recommendations for on-site vibration standards
[DE84-011756] N84-30207
Automatic beam centering at the SSC interaction regions
[DE84-010710] N84-30902
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069

LUNAR RANGEFINDING
Recommended program activities, 1986-1996 N84-30478

M

MACHINE TOOLS
Precision flexible machining cells within a manufacturing system
[AD-A142527] N84-30129

MACHINING
Study of mechano-chemical machining of ceramics and the effect on thin film behavior
[AD-A142542] N84-30080
Precision flexible machining cells within a manufacturing system
[AD-A142527] N84-30129
Robotic deburring. Part 1: Preliminary observations
[DE84-010766] N84-30305

MAGMA
Chemical evolution of a high-level magma system: The Black Mountain Volcanic Center, Southern Nevada
[DE84-013321] N84-30587

MAGNESIUM
Synthesis of refractory materials
[DE84-011045] N84-30041

MAGNESIUM OXIDES
Magnesia refractories produced from chemically modified periclase grains and Mg(OH)2 slurries
[PB84-178979] N84-30099

MAGNETIC ANOMALIES
Interpreting three-dimensional gravitational and magnetic anomalies N84-30486
Derivation of crustal magnetic anomalies from MAGSAT
[REPT-609] N84-30569

MAGNETIC COILS
Ceramics for fusion devices
[DE84-011409] N84-30082
Electromagnetic inspection of wire ropes using sensor arrays
[AD-A142012] N84-30321
Ring-type support concept for twisted coils (finite element simulation) — stellarators
[IPP-2/271] N84-30327

MAGNETIC EFFECTS
Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681

MAGNETIC FIELD CONFIGURATIONS
Orbital stability in combined uniform axial and three-dimensional wiggler magnetic fields for free-electron lasers
[NASA-TM-83753] N84-30273
Hamiltonian structure of field-line equations
[DE84-011019] N84-30836
Internal magnetic field measurements in a translating field-reversed configuration
[DE84-010054] N84-30854
Ohmic heating to 100-eV and helicity injection in CTX
[DE84-007494] N84-30986

MAGNETIC FIELDS
Exploration of phase stability in the surfatron accelerator
[DE84-011416] N84-30280
Derivation of crustal magnetic anomalies from MAGSAT
[REPT-609] N84-30569
Effect of constant and low-frequency magnetic fields on biological systems N84-30679
Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681
Nonlinear dynamics of magnetic islands with curvature and pressure
[DE84-010966] N84-30859
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
Polarization of paraexciton luminescence in Cu2O crystals in magnetic field N84-30670
Instability of collapsing cylindrical shell during magnetic energy density N84-30672
Excitation of quasi-static magnetic fields in axial structures N84-30673
Plasma in diverter during intense recycling N84-30877
Electron motion in solenoidal magnetic fields using a first order symplectric integration algorithm
[DE84-011341] N84-30910
Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma
[IPPJ-674] N84-30966
High-gradient, pulsed operation of superconducting niobium cavities
[DE84-012498] N84-31030
The galactic acceleration of ultrahigh energy cosmic rays
[DE84-012442] N84-31080

MAGNETIC FLUX
Electromagnetic inspection of wire ropes using sensor arrays
[AD-A142012] N84-30321

MAGNETIC INDUCTION
New 1-phase dual converter for superconducting inductive energy storage and transfer applications: The 1-phase inductor-converter bridge
[DE84-012118] N84-30193

MAGNETIC MATERIALS
Biasing and fast degaussing circuit for magnetic materials
[DE84-011281] N84-30857

MAGNETIC MEASUREMENT
Interpreting three-dimensional gravitational and magnetic anomalies N84-30486
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer N84-30665

MAGNETIC MIRRORS
Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900
Electron cyclotron radiation from mirror-confined plasma
[DE84-008665] N84-30970
Theoretical aspects of mirror fusion
[DE84-009139] N84-30988

MAGNETIC PROPERTIES
Noncubic magnetic anisotropy in YSmLuCaFeGe garnet films N84-30669

MAGNETIC RESONANCE
Experimental observation of the shear Alfven resonance in a Tokamak
[DE84-012993] N84-30998

MAGNETIC STORMS
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076

MAGNETIC SURVEYS
Bias removal for conventional magnetotelluric data
[DE84-012189] N84-30579

MAGNETIC SUSPENSION
Magnetic suspension and balance system study
[NASA-CR-3802] N84-29888

MAGNETIC TAPES
Effects of water-vapor on friction and deformation of polymeric magnetic media in contact with a ceramic oxide
[NASA-TM-83727] N84-30072

MAGNETIC VARIATIONS
Report of the geomagnetic and geoelectric observations, 1982 (rapid variations)
[KMO-23] N84-30567

MAGNETIZATION
Electromagnetic inspection of wire ropes using sensor arrays
[AD-A142012] N84-30321

MAGNETOACOUSTIC WAVES
Reduced equations in three dimensional geometry
[DE84-009401] N84-30841

MAGNETOHYDRODYNAMIC FLOW
Semi-implicit method for three-dimensional compressible MHD simulation
[IPP-6/234] N84-30961

MAGNETOHYDRODYNAMIC GENERATORS
Ceramic to metal attachment system — magnetohydrodynamic generators
[DE84-011095] N84-30085

MAGNETOHYDRODYNAMIC STABILITY
Applied mathematics of transport theory
[DE84-011498] N84-30838
MHD equilibrium and stability of rotating FRCs with excluded multipole fields
[DE84-007477] N84-30853

Nonlinear dynamics of magnetic islands with curvature and pressure
[DE84-010968] N84-30659
Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900
Generalized Poisson brackets and nonlinear Liapunov stability: Application to reduced MHD
[DE84-009973] N84-30972
Equilibrium and stability of the Los Alamos spheromak
[DE84-010064] N84-30975
The 3-D MHD stability of high-beta free-boundary Tokamak plasmas with finite edge-pressure-gradient and limiter stabilization
[DE84-009188] N84-30976
Theoretical aspects of mirror fusion
[DE84-009139] N84-30988
Analysis of surface currents on the CTX mesh flux conserver
[DE84-007491] N84-30989
Microstability theory for distributions separable in energy and pitch angle
[DE84-009683] N84-30991
Magnetohydrodynamic equilibrium and stability of stellarators
[DE84-010731] N84-30994
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010842] N84-30999
Interaction of the precessional wave with free-boundary Alfven surface waves in tandem mirrors
[DE84-012527] N84-31003

MAGNETOHYDRODYNAMIC TURBULENCE
Kolmogorov-style argument for the decaying homogeneous MHD turbulence
[IPPJ-677] N84-30963

MAGNETOHYDRODYNAMIC WAVES
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma
[IPPJ-674] N84-30966
Generalized Poisson brackets and nonlinear Liapunov stability: Application to reduced MHD
[DE84-009973] N84-30972
Experimental observation of the shear Alfven resonance in a Tokamak
[DE84-012993] N84-30998
Interaction of the precessional wave with free-boundary Alfven surface waves in tandem mirrors
[DE84-012527] N84-31003

MAGNETOHYDRODYNAMICS
Reduced equations in three dimensional geometry
[DE84-009401] N84-30841
Mixed mode operation in CTX
[DE84-007493] N84-30985

MAGNETOMETERS
Accuracy of mapping the Earth's gravity field fine structure with a spaceborne gravity gradiometer mission
N84-30473

MAGNETOPLASMADYNAMICS
MPD thruster comparisons with advanced chemical systems for auxiliary propulsion applications
N84-29928
An MPD thruster with liquid metal injection
[ISAS-610] N84-30103

MAGNETOSPHERE
Some contributions to knowledge of the magnetospheric plasma by ISEE investigators
[NASA-TM-86124] N84-30962

MAGNETOSPHERIC INSTABILITY
Geophysical plasmas and atmospheric modeling
[AD-A142573] N84-30572

MAGNETS
Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918

MAINTAINABILITY
AN/APN-128 Lightweight Doppler Navigation System (LDNS) case study report (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142072] N84-29860
F-15 AN/APG-63 radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142071] N84-29873
F-16 APG-66 fire control radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142075] N84-29874
R and M (Reliability and Maintainability) program review elements document (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142073] N84-30322

MAINTENANCE
Study of the FAA (Federal Aviation Administration) program to modernize maintenance operations
[AD-A142295] N84-29848
Field repair of AH-16 helicopter window cutting assemblies
[NASA-TM-85831] N84-29864
Battery test results on Gould GC2-EV200
[DE84-900635] N84-30208
Advanced teleoperation in nuclear applications: Consolidated fuel reprocessing program
[DE84-011631] N84-30303
Effects of variations in coldworking repair procedures on flaw growth and structural life
[AD-A141968] N84-30336
Operation and maintenance of selected ozone and ultraviolet disinfection systems
[PB84-180124] N84-30719
Improvements to software maintenance methods in real time embedded aviation flight systems
[AD-A141949] N84-30742

MAN ENVIRONMENT INTERACTIONS
Forest environments N84-30439
Land biology N84-30440
Tropospheric chemistry N84-30441

MAN MACHINE SYSTEMS
Man-machine systems group
[WTHD-161] N84-30703
The Man-Machine Systems Group N84-30704
Summaries of doctorate theses — man machine systems N84-30705
Supervisory control: Introduction and theory — industrial plant control N84-30706
A utility plant simulator for control room experiments
N84-30708
Interaction of human cognitive models and computer-based models in supervisory control
[AD-A142677] N84-30717

MANAGEMENT
Fault management N84-30709

MANAGEMENT ANALYSIS
Stronger direction needed for the National Earthquake Program
[GAO/RCED-83-103] N84-30570
Development of a document preparation staff within an office automation environment
[DE84-008649] N84-31041

MANAGEMENT INFORMATION SYSTEMS
Appropriate technology management information system
[DE84-010952] N84-31056

MANAGEMENT PLANNING
Guidelines for contingency planning NASA (National Aeronautics and Space Administration) ADP security risk reduction decision studies
[PB84-189836] N84-30737
Integrated Computer-Aided Manufacturing (ICAM) architecture, part 3. Volume 5: Composite function model of manufacture product (MFG0)
[AD-A142337] N84-30766
Development of a document preparation staff within an office automation environment
[DE84-008649] N84-31041
National Aeronautics and Space Administration's first-year implementation of the Federal Managers' Financial Integrity Act
[PB84-188770] N84-31044

MANAGEMENT SYSTEMS
Configuration management with the Ada (trademark) language
[AD-P003416] N84-30748

MANGANESE
Influence of processing on the cryogenic mechanical properties of high strength high manganese stainless steel
[DE84-008242] N84-30027

MANGANESE ALLOYS
Study of high performance alloy electroforming
[NASA-CR-173828] N84-30013
Transmutation of manganese: Substituted steels in STARFIRE
[DE84-010402] N84-30035

MANIFOLDS (MATHEMATICS)
Supersymmetric nonlinear sigma models constrained on a noncompact manifold
[PREPRINT-356] N84-30843

MANIPULATORS
Manipulator having thermally conductive rotary joint for transferring heat from a test specimen
[DE84-010958] N84-30242
Dual arm master controller concept: Consolidated fuel reprocessing program
[NASA-CR-173843] N84-30296
Advanced teleoperation in nuclear applications: Consolidated fuel reprocessing program
[DE84-011631] N84-30303

MANPOWER
A system for policy analysis in manpower planning. Part 2: Design of the dialogue component
[AD-B082961] N84-31043

MANUAL
Compressed air systems: A guidebook on energy and cost savings
[DE84-008802] N84-30133

MANUAL CONTROL
Summaries of doctorate theses — man machine systems N84-30705

MANUALS
Guide to graphics at ANL, revised
[DE84-013189] N84-30786
Linear systems analysis program: Programmer's manual, version 2.2 (VAX/VMS)
[DE84-010953] N84-30835

MANUFACTURING
Low cost manufacturing of tactical rocket motors
N84-29959
High performance Extrusion Cast Explosives (ECX)
[DE84-008244] N84-30107
The 8th European Specialist Workshop on Active Microwave Semiconductor Devices 4-6 may 1983
[AD-A142252] N84-30180

MANY BODY PROBLEM
Introduction to neutron scattering by magnetic excitations
[DE84-008579] N84-30904

MAPPING
Ground penetrating radar: A review of its application in the mining industry, information circular 1984
[PB84-178292] N84-30172
Polar glaciology N84-30445
Automatic symbol generating for topographic maps using raster data processing following the example of the general topographic map 1:200,000 (TUEK 200)
N84-30497
Application of FASTRAK by Skandinavisk Autodigitaliserings AB (SADAB) cartographic service
N84-30498
Cooperative line extraction of aerial photos and maps
N84-30502
An improved accuracy general remapping algorithm
[DE84-004320] N84-30837
Characterization of micron-sized, optical coating defects by photothermal deflection microscopy
[DE84-011150] N84-30960

MAPS
Worldwide energy resource distribution estimates
[DE84-012216] N84-30612
US average wind power by season
[DE84-012214] N84-30613
Report on functional design specification for the automated alphanumeric data entry system
[AD-A142518] N84-30725

MARINE BIOLOGY
Air pollution effects on aquatic ecosystems: Summary of a symposium
[PB84-185214] N84-30562

MARINE ENVIRONMENTS
Study of the fatigue crack propagation characteristics of YB-3 and YB-4 aeronautical organic glass
N84-30069

MARINE METEOROLOGY
A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979
[AD-A142548] N84-30631

MARKET RESEARCH
Economics of a conceptual 75 MW hot dry rock geothermal electric power station
[DE83-015926] N84-30539
Computer science and technology: Introduction to software packages
[NBS-SP-500-114] N84-30740

MARKING
Using chemically reactive tracers to determine temperature characteristics of geothermal reservoirs
[DE84-011373] N84-30580

MARKOV CHAINS
Accuracy of one approximate method for computing radiative fluxes in presence of broken clouds
N84-30491

MARKOV PROCESSES
Applications of combinatorics to the busy period in several queueing models
[AD-A142492] N84-30650

MARSHLANDS
Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data
N84-30419
MARTENSITIC TRANSFORMATION
A study of the tempering transformation of retained austenite in isothermal quenching structures, bainite tempered embrittlement N84-30065
MARYLAND
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429
Long-term salinity, temperature and current measurements in upper Chesapeake Bay
[PB84-180280] N84-30638
MASERS
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900
MASKING
Analysis of LANDSAT-4 TM data for lithologic and image mapping purpose N84-30390
MASS
The 19th Moriond meeting: Summary talk
[DE84-010053] N84-31072
MASS SPECTROMETERS
Improved gaseous leak detector
[DE84-011295] N84-30265
Analyzer for determining helium-4 in the part-per-billion range
[PB84-169554] N84-30272
MASS SPECTROSCOPY
Pulsed-laser atom-probe studies of surface chemical reactions
[DE84-012811] N84-30007
MASS TRANSFER
Open cycle lithium chloride cooling system
[DE84-005831] N84-30234
MASSACHUSETTS
Water resources data for Massachusetts and Rhode Island, water year 1982
[PB84-180009] N84-30521
MATCHING
RFQ radial matching sections and fringe fields
[DE84-011408] N84-30920
MATERIALS SCIENCE
The use of space laboratories for materials investigations, process engineering, and scientific purposes N84-29695
MATHEMATICAL MODELS
Decision analysis model for passenger-aircraft fire safety with application to fire-blocking of seats
[AD-A142477] N84-29859
Improved pilot model for application to a computer flight testing program for helicopters
[NLR-MP-83052-U] N84-29869
A theoretical and experimental study of turbulent nonevaporating sprays
[NASA-CR-174668] N84-29877
Design of a candidate flutter suppression control law for DAST ARW-2
[NASA-TM-86257] N84-29883
OMV: A simplified mathematical model of the orbital maneuvering vehicle
[NASA-CR-171123] N84-29902
Recent applications of the CONTAM 3 computer model to spacecraft propulsion systems N84-29916
A study of stiffness, residual strength and fatigue life relationships for composite laminates
[NASA-CR-172211] N84-29978
Thin flame model for reactive flow in porous materials
[DE84-011406] N84-30002
Dynamic powder compaction
[DE84-006133] N84-30132
Performance of Beverage antennas at low angles
[DE84-011163] N84-30164
Atomization of liquid sheets in high pressure airflow
[NASA-TM-83731] N84-30223
Numerical simulations of the structure and propagation of self-sustained detonations
[AD-A142486] N84-30230
Numerical and analytical studies of steady detonation waves with expansion losses
[AD-A142601] N84-30232
Application of molecular dynamics to macroscopic particles
[DE84-011066] N84-30244
Dust particles in high speed flows: Calculations of small particle reentry hydrodynamics
[DE84-010998] N84-30245
INFIL1D: A quasi-analytical model for simulating one-dimensional, constant flux infiltration
[DE84-008905] N84-30250
Study of ebullated bed fluid dynamics
[DE84-010230] N84-30251
Progress in the development of an intermittency model of turbulence
[CFD/83/7] N84-30255
Wave uplift pressure on horizontal platforms
[PB84-190626] N84-30257
A theory for cross-coupling in ultrasonic transducer arrays
[DE84-010327] N84-30259
The penetration model of Dehn — terminal ballistics
[PML-1984-5] N84-30316
Effects of bond deterioration on hysteretic behavior of reinforced concrete joints
[PB84-192020] N84-30343
Instrumenting and interpreting the time-varying response of structural systems
[DE84-009067] N84-30346
Research activities of the Geodynamics Branch
[NASA-TM-86123] N84-30455
Geodynamics of crustal deformation and seismotectonic block movements in central Europe N84-30460
Verification of the accuracy of GEM-L2 in response to criticism by Lambeck and Coleman N84-30466
Interpreting three-dimensional gravitational and magnetic anomalies N84-30486
Quasi-two-day variation of lower thermosphere wind velocities N84-30488
Estimation of recharge in a small southern Arizona basin by means of hydrological, hydrochemical, and environmental isotope data
[PB84-159672] N84-30527
Mechanisms of interannual ocean-atmosphere interactions
[NASA-CR-173834] N84-30595
Daylight availability as a function of atmospheric conditions
[DE84-007973] N84-30609
Applications of combinatorics to the busy period in several queueing models
[AD-A142492] N84-30850
A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912
Reactive resonance and angular distributions in the rotating linear model
[DE84-011354] N84-30919
Monte Carlo simulation of the microcanonical ensemble
[DE84-010880] N84-30923
Optical second-harmonic generation for surface studies
[DE84-010718] N84-30958
A new model of Raman spectra in laser produced plasma
[DE84-012487] N84-31005
Computer simulation studies of sputtering and multimer formation from clean and oxygen reacted surfaces of titanium, vanadium and niobium
[AD-A141998] N84-31009
Fractional quantization of the Hall effect
[DE84-008894] N84-31023
A steady-state version of a dynamic optimal budgeting problem
[AD-A142281] N84-31034
MATHEMATICS
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
MATRICES (MATHEMATICS)
A numerical algorithm for chained aggregation and modified chained aggregation
[AD-A142394] N84-30822
New lasing ferroelectric material Pb5Ge3O11-Nd-3(+)
N84-30875
MATRIX THEORY
Spectral and invertibility properties of band matrices
[AD-A142637] N84-30831
MAXIMUM LIKELIHOOD ESTIMATES
Flight investigation of various control inputs intended for parameter estimation
[NASA-TM-85901] N84-29884
MEAN FREE PATH
Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918
MEASUREMENT
Stochastic quantization: Stabilizing quantum models
[REPT-80] N84-31032
MEASURING INSTRUMENTS
Comparison of icing cloud instruments for 1982-1983 icing season flight program
[NASA-TM-83569] N84-29870
Measurements of dissolved gases at Corps of Engineers projects
[AD-A142727] N84-30130
Microprocessor automation for the Dynaflect Deflection Measuring System
[PB84-180413] N84-30135
Friction in low speed lubricated rolling and sliding contacts
[VTT-16] N84-30318
Instrumenting and interpreting the time-varying response of structural systems
[DE84-009067] N84-30346
Implementation strategy N84-30453
Thermoacoustic couple
[DE84-011296] N84-30695
MECHANICAL DEVICES
Flexure hinge
[PB84-178557] N84-30319
Artificial intelligence and robotics
[AD-A142488] N84-30810
MECHANICAL DRIVES
Prediction and analysis of variable reluctance stepmotor drive systems
[NLR-TR-81139-U] N84-30216
MECHANICAL IMPEDANCE
Application of electrochemical and mechanical impedance measurements to corrosion induced failures
[AD-A142468] N84-30021
MECHANICAL PROPERTIES
Electropositive bivalent metallic ion unsaturated polyester complexed polymer concrete
[DE84-011080] N84-29979
Study of high performance alloy electroforming
[NASA-CR-173828] N84-30013
Thermomechanical processing and texture development in Ni-Cr-Mo and Mn-Mo-B armor steels
[AD-A142352] N84-30020
Influence of processing on the cryogenic mechanical properties of high strength high manganese stainless steel
[DE84-008242] N84-30027
The influence of nitrogen on the sensitization, corrosion, mechanical and microstructural properties of stainless steels
[DE83-017203] N84-30050
The effects of non-metallic inclusions in steel on fatigue properties N84-30070
Criterion for quasibrittle crack growth
[DE84-010052] N84-30349
MEDICAL SCIENCE
USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-84-016] N84-30675
MEDITERRANEAN SEA
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512
MELTING POINTS
New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30666
MELTS (CRYSTAL GROWTH)
Silicon crystal growing by oscillating crucible technique
[DE84-011036] N84-31019
MEMORY
The representation of part-whole information in memory
[PB84-180140] N84-30701
MEMORY (COMPUTERS)
An operating system and memory switch for the S-1 computer
[DE84-013094] N84-30731
MERCURY (METAL)
Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys
[DE84-012547] N84-30519
MERCURY CADMIUM TELLURIDES
Transient and diffusion analysis of HgCdTe
[NASA-CR-162049] N84-30015
MESH
An improved accuracy general remapping algorithm
[DE84-004320] N84-30837
Analysis of surface currents on the CTX mesh flux conserver
[DE84-007491] N84-30989
MESOSCALE PHENOMENA
Ocean circulation studies N84-30469
Soil moisture from temperature measurements at the Earth's surface, update N84-30474
Objective analysis and prediction techniques, 1983
[AD-A142441] N84-30599
MESSAGE PROCESSING
Decentralized estimation in communication networks with delay
[AD-A142376] N84-30155
METABOLISM
Use of vitamins during adaptation to high altitudes
N84-30643

METAL AIR BATTERIES
Development of hydrocyclones for aluminum/air battery applications
[DE84-011403] N84-30197

METAL BONDING
Ceramic to metal , attachment system — magnetohydrodynamic generators
[DE84-011095] N84-30085
HgCdTe surface and defect study program
[AD-A142342] N84-31010

METAL CUTTING
Electric arc saw apparatus
[DE84-006153] N84-30308

METAL DRAWING
Analysis of fracture modes during extrusion and drawing of bimetal rods or wire
[DE84-009849] N84-30051

METAL FATIGUE
Surface layer effects on the mechanical behavior of metals
[AD-A142280] N84-30018
Creep-fatique and temperature synergisms in alloy 800
[DE84-010131] N84-30046

METAL FILMS
RF sputtering and annealing of amorphous zinc telluride films
[USIP-84-04] N84-30061

METAL IONS
Electropositive bivalent metallic ion unsaturated polyester complexed polymer concrete
[DE84-011080] N84-29979

METAL OXIDES
Synthesis of refractory materials
[DE84-011045] N84-30041

METAL PARTICLES
Liquid metal infiltration of an aluminum alloy into a packed column of B4C particles
[DE84-012136] N84-30055

METAL PLATES
Strains in an elastic plate containing an interference-fit bolt near a free edge
[AR-003-012] N84-30333

METAL POWDER
A study of the dependence of microsegregation on critical solidification parameters in rapidly-quenched structures
[AD-A142293] N84-30019
Analysis of localized microstructural changes in dynamically consolidated metal powders
[DE84-006298] N84-30026
Hard metal composition
[DE84-011034] N84-30040
Mechanical properties of a shock consolidated steel powder
[DE84-003573] N84-30056

METAL SURFACES
Surface layer effects on the mechanical behavior of metals
[AD-A142280] N84-30018

METALS
Surface layer effects on the mechanical behavior of metals
[AD-A142280] N84-30018
Ceramic-glass-metal seal by microwave heating
[DE84-011283] N84-30295
A users manual for the laser welding code WELD2D
[DE84-011167] N84-30306
Fatigue and Fracture Branch: A compendium of recently completed and on-going research projects
[NASA-TM-85825] N84-30331
Photoemission studies of mixed valent systems
[DE84-010797] N84-31020

METEOROLOGICAL PARAMETERS
Observational requirements and measurement systems concepts N84-30452
Meteorological research and support for the MIZEX (Marginal Ice Zone Experiment) program
[AD-A142409] N84-30598
Climatological Summary Programs F6 and CLIMAT
[PB84-185941] N84-30603
Some physical concepts in complex terrain meteorology derived from the Department of Energy's ASCOT program
[DE84-010059] N84-30607
World meteorological activities report
[WMO-628] N84-30614
Analysis of some cloud and frontal events recorded during the Boulder Upslope Cloud Observation Experiment (BUCOE) of 1982
[PB84-179862] N84-30622

METEOROLOGICAL RADAR
Objective analysis and prediction techniques, 1983
[AD-A142441] N84-30599

METEOROLOGICAL SATELLITES
Evolution and flight history of the Defense Meteorological Satellite Program (DMSP) propulsion module N84-29917
Objective analysis and prediction techniques, 1983
[AD-A142441] N84-30599

METEOROLOGICAL SERVICES
World meteorological activities report
[WMO-628] N84-30614

METEOROLOGY
USSR report: Earth sciences
[JPRS-UES-84-006] N84-30479
Inevitable climatic changes N84-30480
Publications — bibliographies N84-30594
Objective analysis and prediction techniques, 1983
[AD-A142441] N84-30599
World meteorological activities report
[WMO-628] N84-30614
National Weather Service hurricane probability program
[PB84-182757] N84-30619

METHANE
Scattering experiments on rotational excitation of methane in collision with noble gases
[MPIS-3/1984] N84-30936

METHYLATION
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557

MICHIGAN
Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422
Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications N84-30431

MICROBIOLOGY
Photo/Biological Hydrogen Principal Investigators Review Meeting: Proceedings of the May 1983 Program Review
[DE84-000083] N84-30536

MICROCOMPUTERS
Communicating between the IBM personal computer and the Wang word processing system
[DE84-010423] N84-30729
Military Computer Family Operating System: An Ada (trademark) application
[AD-P003427] N84-30759
Report on the experience with the Supervisory Control and Diagnostics System (SCDS) of MFTF-B
[DE84-012599] N84-30807
Control computer and automation subsystem equipment in Delfin Facility N84-30880

MICROCRACKS
Fatigue behavior of long and short cracks in wrought and powder aluminum alloys
[AD-A142609] N84-30024
Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy
[DE84-011458] N84-30028

MICROPHONES
Two-way unidirectional condenser microphone
[NHK-LABS-NOTE-297] N84-30175

MICROPROCESSORS
Microprocessor automation for the Dynaflect Deflection Measuring System
[PB84-180413] N84-30135
Proton-induced single event upsets in the SBP9989 microprocessor
[AD-A142448] N84-30724
Communicating between the IBM personal computer and the Wang word processing system
[DE84-010423] N84-30729
Current research in parallel microprocessing systems at Los Alamos
[DE84-011342] N84-30804
Automated planning for intelligent machines in energy-related applications
[DE84-011666] N84-30815
The application of a general purpose data base management system to design automation
[AD-A141999] N84-31048

MICROSCOPY
Characterization of the microstructures of various materials
[AD-A141946] N84-30017

MICROSTRUCTURE
Thin film synthesis of superconducting chemical compounds
[AD-A142541] N84-29992
Analysis of localized microstructural changes in dynamically consolidated metal powders
[DE84-006298] N84-30026
The influence of nitrogen on the sensitization, corrosion, mechanical and microstructural properties of stainless steels
[DE83-017203] N84-30050
Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy
[DE84-012111] N84-30053
The effects of solid solution temperatures and cooling rates on the microstructures of BT3-1 titanium alloy N84-30066
Characteristics of initial period fatigue crack propagation of metals and its affecting factors N84-30071
Low temperature sintering of Al2O-CaO
[DE84-010713] N84-30083
High resolution electron microscopy studies of the early stages of decomposition in alloys and ceramics
[DE84-020802] N84-30087
Characterization of submerged-arc and gas-metal-arc weldments in hY-100 steel
[AD-A141939] N84-30298
Electron-microscopic microstructural examination of glassy Ge-Se semiconductors N84-30871

MICROWAVE ATTENUATION
Evaluation of the attenuation length of a scintillator by means of a computer simulation of the light collection efficiency in long scintillation counters
[NOTA-INTERNA-820] N84-30169
The evaluation of prediction models for microwave attenuation by rainfall
[PB84-182104] N84-30170

MICROWAVE CIRCUITS
MMIC technology for advanced space communications systems
[NASA-TM-83749] N84-30147

MICROWAVE EQUIPMENT
Description of a microwave system for the measurement of close to carrier AM and FM noise spectra
[LEOK-TR-1984-04] N84-30168
The 8th European Specialist Workshop on Active Microwave Semiconductor Devices 4-6 may 1983
[AD-A142252] N84-30180
Earth Observing System. Science and mission requirements, volume 1, part 1
[NASA-TM-86129-VOL-1-PT-1] N84-30450

MICROWAVE TRANSMISSION
An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array
[AD-A142478] N84-30159

MICROWAVES
A study of distributed millimeter-wave isolators
[AD-A142729] N84-30189
Ceramic-glass-metal seal by microwave heating
[DE84-011283] N84-30295
Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657
Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682
Theoretical studies of Elma Bumpy Torus (EBT)
[DE84-010814] N84-30978

MIDDLE ATMOSPHERE
Middle atmospheric science N84-30448

MILITARY OPERATIONS
Analysis of computer interactive tests for assigning helicopter pilots to different missions
[AD-A142434] N84-30696
Computer graphics enhancement for COMEL (communications electronics)
[AD-A141920] N84-30741
A model of inter-organizational influences on organizational processes
[AD-A142450] N84-31037

MILITARY TECHNOLOGY
Air Force Academy Aeronautics Digest
[AD-A142399] N84-29849
High performance Extrusion Cast Explosives (ECX)
[DE84-008244] N84-30107
Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense
[AD-A141982] N84-30721
Military Computer Family Operating System: An Ada (trademark) application
[AD-P003427] N84-30759

MILKY WAY GALAXY
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069

MILLIMETER WAVES
MMIC technology for advanced space communications systems
[NASA-TM-83749] N84-30147
A study of distributed millimeter-wave isolators
[AD-A142729] N84-30189
Biological effects of millimeter-wave irradiation: Living bacterial organisms
[AD-A142474] N84-30670
Strained layer superlattice materials for millimeter wave FET's, phase 1
[DE84-011475] N84-31007
MINERAL EXPLORATION
Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results — Death Valley, California, Cement-Velma, Oklahoma; Big Horn and Wind River Basins, Wyoming; Spanish Peaks, Colorado; and the Four Corners area (Paradox Basin of Utah and Colorado) N84-30412
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 1: Executive summary
[PB84-187930] N84-30639
MINERALS
Sulfidation- and oxidation-resistant ferritic stainless steel containing aluminum
[PB84-189521] N84-30101
MINES (EXCAVATIONS)
Ground penetrating radar: A review of its application in the mining industry, information circular 1984
[PB84-178292] N84-30172
Final comparison of TM and MSS data for surface mine assessment in Logan County, West Virginia N84-30430
Reports on cartography and geodesy. Series 1: Original reports, number 92
[ISSN-0469-4236] N84-30495
DIGMAP, an interactive graphic support system for mine survey N84-30496
MINICOMPUTERS
Voice Interactive Systems Technology (VIST) research
[AD-A142698] N84-30726
Military Computer Family Operating System: An Ada (trademark) application
[AD-P003427] N84-30759
MINING
Seismicity of the Paradox Basin and the Colorado Plateau interior
[DE84-011620] N84-30516
MIRROR FUSION
Impurity characteristics of TMX-U
[DE84-012413] N84-30932
Theoretical aspects of mirror fusion
[DE84-009139] N84-30988
MIRRORS
The Spot of Arago and its role in aberration analysis
[AD-A141983] N84-30952
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010642] N84-30999
Interaction of the precessional wave with free-boundary Alfven surface waves in tandem mirrors
[DE84-012527] N84-31003
MISSILE CONFIGURATIONS
Wind tunnel tests on a tube-launched missile configuration with a deflectable nose control and a novel wrap-around fin stabiliser
[AD-A142062] N84-29900
MISSILE TRAJECTORIES
Application of sensitivity analysis to aerodynamic parameters of a bank to turn missile
[AD-A141940] N84-29899
MIXING
Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4
[DE84-012336] N84-30052
MIXTURES
Hard metal composition
[DE84-011034] N84-30040
MODAL RESPONSE
Bond graph time simulations using extracted modal parameters from the Nova spaceframe
[DE84-010918] N84-30779
MODELS
Flow of foam through porous media
[DE84-012410] N84-30246
Update: San Andreas Fault experiment N84-30456
Computer science and technology: Report on approaches to database translation
[NBS-SP-500-115] N84-30739
MODES
Dynamic synthesis and evaluation of spacecraft structures
[ESA-STR-208] N84-29904
The 3-D MHD stability of high-beta free-boundary Tokamak plasmas with finite edge-pressure-gradient and limiter stabilization
[DE84-009186] N84-30976
MODULATION TRANSFER FUNCTION
MTF analysis of LANDSAT-4 Thematic Mapper N84-30368
MODULES
APL/JHU free flight tests of the general purpose heat source module. Testing: 5-7 March 1984
[DE84-011065] N84-30948
MOIRE EFFECTS
Holographic FLI for detection of defects
[AD-A142733] N84-30258
MOISTURE
Automated analysis of upper air soundings to specify precipitation type
[PB84-174333] N84-30617
MOISTURE CONTENT
Electro-optical transmission and liquid water content of fogs and clouds
[AD-A142294] N84-30597
MOLECULAR ABSORPTION
Resonance absorption of narrow-band laser radiation by atmospheric gases N84-30493
MOLECULAR BEAMS
Photoionization investigation of iodine molecules and clusters in a supersonic molecular beam
[AD-A142645] N84-30901
MOLECULAR DIFFUSION
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29981
MOLECULAR EXCITATION
Photoionization of excited molecular states using multiphoton excitation techniques
[DE84-004034] N84-30925
Scattering experiments on rotational excitation of methane in collision with noble gases
[MPIS-3/1984] N84-30936
MOLECULAR INTERACTIONS
Application of molecular dynamics to macroscopic particles
[DE84-011066] N84-30244
MOLECULAR IONS
Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918
Determination of energetics and spectra of simple molecular systems using theoretical methods
[DE84-009668] N84-30930
MOLECULAR OSCILLATIONS
CO2 gamma 3 fundamental band 4.5 micrometers laser potential
[AD-A142536] N84-29991
MOLECULAR OSCILLATORS
The transfer of atoms, ions and molecular groups in solution. Part 2: Tunnelling between harmonic wells
[AD-A142334] N84-29982
MOLECULAR ROTATION
Freejets of rotationally relaxing diatomic gases N84-30119
Scattering experiments on rotational excitation of methane in collision with noble gases
[MPIS-3/1984] N84-30936
MOLECULAR STRUCTURE
Macrocycles containing tin. Synthesis and structure of 1,10-Diphenyl-1,10-Distannabicycle (8.8.8)Hexacosane
[AD-A142703] N84-29966
MOLECULES
Macrocycles containing tin. Synthesis and structure of 1,10-Diphenyl-1,10-Distannabicycle (8.8.8)Hexacosane
[AD-A142703] N84-29966
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983
Ultraviolet light absorbers having 2 different chromophors in the same molecule
[DE84-011279] N84-30000
Photoionization investigation of iodine molecules and clusters in a supersonic molecular beam
[AD-A142645] N84-30901
MOLYBDENUM
Aspects of electroless nickel plating on molybdenum
[DE84-006434] N84-30057
Coated silica shells: An advanced hydrogen storage system
[DE84-008986] N84-30088
MONITORS
Design of a safety monitor system for high explosives machining
[DE84-010101] N84-30113
Vapor spill pipe monitor
[DE84-011103] N84-30267
MONKEYS
Walking erect as a factor in development of arterial hypertension in primates N84-30645
Delayed effects of proton irradiation in Macaca mulatta. 3: Glucose intolerance
[AD-A142269] N84-30669
MONOMERS
High energy binders
[AD-A142347] N84-30105
MONTANA
Weather summaries for Coram Experimental Forest, Northwestern Montana: An international biosphere reserve
[PB84-182443] N84-30615
MONTE CARLO METHOD
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983
Monte Carlo simulation of the microcanonical ensemble
[DE84-010980] N84-30923
MORPHOLOGY
Characterization of block copolymers based on poly(3,3-bis(ethoxymethyl)oxetane) and other novel polyethers
[AD-A142606] N84-30081
Effect of charging methods on battery electrodes
[DE84-010287] N84-30196
MOSSBAUER EFFECT
Feasibility studies of Conversion Electron Moessbauer Spectroscopy (CEMS) of iron-doped InP
[AD-A142463] N84-31014
MOTION SIMULATION
OMV: A simplified mathematical model of the orbital maneuvering vehicle
[NASA-CR-171123] N84-29902
MOUNTAINS
Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys
[DE84-012547] N84-30519
MULTIPHASE FLOW
Energy release and fluid dynamics in multiphase systems
[AD-A142402] N84-30228
Study of ebullated bed fluid dynamics
[DE84-010230] N84-30251
MULTIPOLES
MHD equilibrium and stability of rotating FRCs with excluded multipole fields
[DE84-007477] N84-30853
MULTIPROCESSING (COMPUTERS)
The S-1 Mark IIA supercomputer
[DE84-012374] N84-30732
Interfacing CAMAC to a high-speed multiprocessor bit slice data-acquisition system
[DE84-009986] N84-30780
Characterization of real-time computers
[NASA-CR-3807] N84-30801
MULTISPECTRAL BAND SCANNERS
Multispectral Scanner (MSS) instrument description N84-30362
Spectral characterization of the LANDSAT Thematic Mapper sensors N84-30372
Spectral characterization of the LANDSAT-4 MSS sensors N84-30402
Investigation of radiometric properties of LANDSAT-4 MSS N84-30403
Geometric accuracy of LANDSAT-4 MSS image data — Georgia N84-30406
Geometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) — Washington, D.C. N84-30407
Impact of LANDSAT MSS sensor differences on change detection analysis N84-30408
LANDSAT-4 MSS geometric correction: Methods and results N84-30409
Preliminary evaluation of Thematic Mapper image data quality N84-30415
Quick look analysis of TM data of the Washington, District of Columbia area N84-30418
Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data N84-30419
Comparison of the information content of data from the LANDSAT-4 Thematic Mapper and the Multispectral Scanner N84-30420
Study of Thematic Mapper and Multispectral Scanner data applications N84-30421
Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424

The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30428

Final comparison of TM and MSS data for surface mine assessment in Logan County, West Virginia N84-30430

Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications N84-30431

Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory N84-30432

Earth Observing System, introduction N84-30451

The effect of spatial, spectral and radiometric factors on classification accuracy using thematic mapper data [NASA-TM-85995] N84-30510

MUTAGENS

Use of sperm enzymes to detect genotoxic agents [AD-A142724] N84-30691

MUTATIONS

Biological effects of millimeter-wave irradiation: Living bacterial organisms [AD-A142474] N84-30670

N

NAPHTHALENE

Experimental study of the naphtaline heat pipe N84-30125

NARROWBAND

Strategic blue-green communication filters [AD-A142353] N84-30151

NASA PROGRAMS

Fatigue and Fracture Branch: A compendium of recently completed and on-going research projects [NASA-TM-85825] N84-30331

The LANDSAT-4 program: An overview N84-30360

LANDSAT-4 system description N84-30361

Geodynamics: Introduction and background N84-30476

Guidelines for contingency planning NASA (National Aeronautics and Space Administration) ADP security risk reduction decision studies [PB84-189836] N84-30737

National Aeronautics and Space Administration's first-year implementation of the Federal Managers' Financial Integrity Act [PB84-188770] N84-31044

Index to NASA News Releases and Speeches, 1983 [NASA-TM-85509] N84-31047

NASTRAN

NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures [AD-A142290] N84-30337

NATIONAL AIRSPACE UTILIZATION SYSTEM

FAA (Federal Aviation Administration) air traffic activity FY 1983 [AD-A142493] N84-29861

NATURAL GAS

High pressure LOX/natural gas staged combustion technology N84-29927

NEAR FIELDS

The Technical University of Denmark (TUD)-ESA spherical near field antenna test facility, Lyngby, Denmark [ESA-BR-19] N84-29890

NEBRASKA

Inventory of geothermal resources in Nebraska [DE84-009679] N84-30518

NEODYMIUM

Rare-earth ion-host lattice interactions: 15. Analysis of the spectra of Nd3+ in Gd3Sc2Ga3O12 [AD-A142555] N84-31015

NEON

Improved gaseous leak detector [DE84-011295] N84-30265

NETHERLANDS

Inventory RF radiation levels in the Netherlands, part 1 [LEOK-TR-1984-02-PT-1] N84-30167

Environmental effects of increasing the amount of district heating in the Netherlands [S/T-REPT-VOL-1-NO-5] N84-30558

NETWORK ANALYSIS

Network repair level analysis model user's guide [AD-A141991] N84-30743

NEUROMUSCULAR TRANSMISSION

Human stomach motor and evacuatory functions during antiorthostatic hypokinesia N84-30649

NEURONS

Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678

Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681

NEUTRAL BEAMS

Impurity characteristics of TMX-U [DE84-012413] N84-30932

NEUTRINOS

The 19th Moriond meeting: Summary talk [DE84-010053] N84-31072

NEUTRON IRRADIATION

Neutron embrittlement of the reactor vessel in Borssele as determined from Charpy specimens [S/T-REPT-VOL-1-NO-4] N84-30352

Defect production efficiencies in thermal neutron irradiated copper and molybdenum [DE84-010993] N84-31018

NEUTRON SCATTERING

Introduction to neutron scattering by magnetic excitations [DE84-008579] N84-30904

NEUTRON SOURCES

High-current, low-energy synchrotrons and compressor rings [DE84-012104] N84-30906

NEUTRON SPECTRA

Modifications to iterative recursion unfolding algorithms and computer codes to find more appropriate neutron spectra [AD-A142475] N84-30775

NEVADA

Chemical evolution of a high-level magma system: The Black Mountain Volcanic Center, Southern Nevada [DE84-013321] N84-30587

Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada [DE84-009032] N84-30610

NEW MEXICO

In-flight absolute radiometric calibration of the Thematic Mapper N84-30383

NICKEL

Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests [DE84-012833] N84-30054

Development of a lightweight nickel electrode [NASA-TM-83739] N84-30528

NICKEL ALLOYS

Study of high performance alloy electroforming [NASA-CR-173828] N84-30013

Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy [DE84-011458] N84-30028

Improved oxidation sulfidation resistance of Fe-Cr-Ni alloys [DE84-010066] N84-30039

Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti [DE84-005411] N84-30043

Creep-fatique and temperature synergisms in alloy 800 [DE84-010131] N84-30046

Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy [DE84-012111] N84-30053

NICKEL CADMIUM BATTERIES

Rapid electrolyte exchange procedures for 22 AH nickel-cadmium celgard cells [AD-A142004] N84-30178

NICKEL PLATE

Aspects of electroless nickel plating on molybdenum [DE84-006434] N84-30057

NICKEL ZINC BATTERIES

Rechargeable zinc batteries [DE84-008947] N84-30192

NIMONIC ALLOYS

Ring ductility of irradiated Inconel 706 and Nimonic PE16 [DE84-010397] N84-30034

NIOBIUM

High-gradient, pulsed operation of superconducting niobium cavities [DE84-012498] N84-31030

NIOBIUM ALLOYS

Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti [DE84-005411] N84-30043

NITRAMINE PROPELLANTS

High performance, low flame temperature nitramine propellant development N84-29946

NITRATE ESTERS

Nitrate ester polyether glycol prepolymers N84-29947

NITRATES

Iron nitrate and MON-3 nitrogen tetroxide N84-29909

NITRIC ACID

Corrosion resistance of selected ceramic materials to nitric acid [PB84-178870] N84-30098

Atmospheric chemistry of H2O2, NO3, HONO, and HNO3: Influence of aqueous phase and heterogeneous processes [PB84-183680] N84-30592

NITRIC OXIDE

Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model [NASA-TM-86285] N84-30586

NITRIDES

Synthesis of refractory materials [DE84-011045] N84-30041

NITROGEN

Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaammineosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands [AD-A142418] N84-29987

The influence of nitrogen on the sensitization, corrosion, mechanical and microstructural properties of stainless steels [DE83-017203] N84-30050

Increase in whole-body peripheral vascular resistance during three hours of air or oxygen prebreathing [NASA-TM-58261] N84-30684

NITROGEN DIOXIDE

Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model [NASA-TM-86285] N84-30586

NITROGEN OXIDES

European views on controlling acid rain [PB84-194206] N84-30563

Measurements of integral state-specific cross sections of inelastic collisions between NO and noble gases [MPIS-18/1983] N84-30935

NITROGEN TETROXIDE

A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919

Purification of nitrogen tetroxide for long-term reliability N84-29920

Electrostatic filtration of N2O4 for removal of solid and vapor contaminants N84-29922

The evaporation and gaseous dispersion of large-scale releases of nitrogen tetroxide [AD-A142079] N84-30104

NITROUS OXIDES

Atmospheric chemistry of H2O2, NO3, HONO, and HNO3: Influence of aqueous phase and heterogeneous processes [PB84-183680] N84-30592

NOCTURNAL VARIATIONS

Some physical concepts in complex terrain meteorology derived from the Department of Energy's ASCOT program [DE84-010059] N84-30607

NOISE (SOUND)

Wind-generated noise in shallow water [AD-A141981] N84-30890

NOISE INTENSITY

Acoustic pressures emanating from a turbomachine stage [NASA-TM-83734] N84-30224

NOISE MEASUREMENT

A method of measuring distortion noise in digital audio equipment [NHK-LABS-NOTE-299] N84-30174

NOISE PROPAGATION

Studies of noise transmission in advanced composite material structures N84-29977

Experimental study of noise transmission into a general aviation aircraft [NASA-CR-172357] N84-30888

NOISE REDUCTION

Scope for active noise abatement in vehicle diesel engines [BLL-M-28767-(5825.4)] N84-30885

Active attenuation of propeller blade passage noise [NASA-CR-172386] N84-30886

Active sound reduction: A study of recent developments and some future possibilities [F83-06] N84-30899

NOISE SPECTRA

Description of a microwave system for the measurement of close to carrier AM and FM noise spectra [LEOK-TR-1984-04] N84-30168

NOMENCLATURES

Government acronyms and alphabetic organizational designations used in DTIC (Defense Technical Information Center) [AD-A142700] N84-31049

NOMOGRAPHS
Nomogram for demonstrating change in central venous and pulmonary artery pressure during decompression of different parts of the body N84-30660
NONDESTRUCTIVE TESTS
A NDT ignition delay predictive tool N84-29958
Adhesive bond and composite strength screening system developmental study
[FZM-7184] N84-30073
Holographic FLI for detection of defects
[AD-A142733] N84-30258
Flaw detection reliability criteria. Volume 1: Methods and results
[AD-A142001] N84-30320
Qualifications of ultrasonic testing for nuclear inservice inspection applications
[DE84-011899] N84-30323
NONLINEAR EQUATIONS
Study of nonlinear singular systems
[AD-A142348] N84-30620
NONLINEAR OPTICS
Two novel plasma diagnostics — single mode optical fiber sensors and phase conjugation in nonlinear optics
[DE84-009970] N84-30990
NONLINEAR SYSTEMS
Europe approaches chaos with electrical circuits
[AD-A142085] N84-30179
Large-signal characterization of nonlinear two-port active networks
[AD-A142462] N84-30184
Techniques for large sparse systems arising from continuation methods
[DE84-010410] N84-30633
Input-output parametric models for nonlinear systems. Part 1: Deterministic nonlinear systems
[RR-251-PT-1] N84-30644
Input-output parametric models for nonlinear systems. Part 2: Stochastic nonlinear systems
[RR-252-PT-2] N84-30645
Nonlinear dynamics of magnetic islands with curvature and pressure
[DE84-010968] N84-30859
The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas
[IPPJ-676] N84-30964
NONLINEARITY
A tractable theory for nonlinear propellant response and cumulative damage predictions N84-29950
Nonlinear structural characterization of solid propellants N84-29951
Locally optimum and suboptimum detector performance in a non-Gaussian interference environment
[PB84-184736] N84-30173
NORMALIZING (STATISTICS)
Renormalized action improvements
[DE84-011610] N84-31028
NORTH CAROLINA
The use of linear feature detection to investigate Thematic Mapper data performance and processing
N84-30393
NORTHERN HEMISPHERE
Spatial distribution of advective heat influxes in atmosphere over Northern Hemisphere and its relationship to heat influxes from ocean N84-30482
NOSE CONES
Wind tunnel tests on a tube-launched missile configuration with a deflectable nose control and a novel wrap-around fin stabiliser
[AD-A142062] N84-29900
NOVA LASER SYSTEM
Nova laser alignment control system
[DE84-010992] N84-30268
Bond graph time simulations using extracted modal parameters from the Nova spaceframe
[DE84-010916] N84-30779
NOZZLE DESIGN
Fluidic thrust vector control thruster development
N84-29940
NUCLEAR EXPLOSIONS
Nuclear electromagnetic pulse (EMP) and electric power systems
[DE84-010665] N84-30166
NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures
[AD-A142290] N84-30337
Common data base experiment: Detection and location capacity
[FOA-C-20538-T1] N84-31058
NUCLEAR FUEL REPROCESSING
Advanced teleoperation in nuclear applications: Consolidated fuel reprocessing program
[DE84-011631] N84-30303
NUCLEAR FUELS
Space nuclear safety program
[DE84-011015] N84-30943
NUCLEAR MAGNETIC RESONANCE
Characterization of organometallic polymers by chromatographic methods and nuclear magnetic resonance, part 2
[PB84-183599] N84-30100
NUCLEAR PHYSICS
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
IEEE Transactions on Nuclear Science. Volume NS-30, no. 4, part 2: 1983 Particle Accelerator Conference
[DE84-007400] N84-30914
Activities in nuclear and high energy physics
[B8467321] N84-30949
NUCLEAR POWER REACTORS
Neutron embrittlement of the reactor vessel in Borssele as determined from Charpy specimens
[S/T-REPT-VOL-1-NO-4] N84-30352
NUCLEAR REACTORS
Flow Induced Vibration Program at Argonne National Laboratory
[DE84-009233] N84-30249
Qualifications of ultrasonic testing for nuclear inservice inspection applications
[DE84-011899] N84-30323
NUCLEAR SPIN
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer
N84-30865
NUCLEAR STRUCTURE
High-spin gamma-ray spectroscopy
[DE84-010716] N84-30929
High energy nuclear structures
[DE84-010062] N84-30947
NUCLEATE BOILING
A blowup phenomenon of the working fluid in a two-phase closed thermosyphon N84-30122
NUCLEATION
Directional growth of pearlite in Fe-C eutectiod alloys
[DE84-007368] N84-30042
NUCLEI (NUCLEAR PHYSICS)
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer
N84-30865
NULL ZONES
Nulling in array patterns with orthogonal analytic cancellation beams
[AD-A142719] N84-30188
NUMERICAL ANALYSIS
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985
Numerical analysis of the burst in the turbulent boundary layer, based on the three-dimensional ortex model
N84-30116
Numerical simulation of autorotation N84-30118
Numerical simulations of the structure and propagation of self-sustained detonations
[AD-A142486] N84-30230
Ada (trademark) tasking in numerical analysis
[AD-P003429] N84-30761
SLATEC mathematical subprogram library, version 2.0
[DE84-010750] N84-30782
Singular value decomposition with systolic arrays
[NASA-CR-172396] N84-30817
Study of nonlinear singular systems
[AD-A142348] N84-30620
Institutional supporting research highlights in physics and mathematics, fiscal year 1983
[DE84-011025] N84-30855
NUMERICAL CONTROL
Design of a safety monitor system for high explosives machining
[DE84-010101] N84-30113
Nova laser alignment control system
[DE84-010992] N84-30268
DBMS conversion case study
[DE84-011205] N84-31054
NUMERICAL WEATHER FORECASTING
Objective analysis and prediction techniques, 1983
[AD-A142441] N84-30599
NUTRIENTS
Chesapeake Bay nutrient dynamics study
[PB84-190982] N84-30524
NUTRITION
Blood plasma free amino acids under hypokinetic conditions N84-30648

O

OBSERVATION
Prediction of slant wind shear with an offset tower observation system
[AD-A142676] N84-30600
Program for Regional Observing and Forecasting Services (PROFS)
[PB84-179926] N84-30618
OCCULTATION
The occultation of AG+29 deg 398 by 98 Minerva
[NASA-CR-173827] N84-31066
OCCUPATION
Chronic effects of repeated mechanical trauma to the skin: A description of the problem in the workplace
[PB84-181767] N84-30695
OCEAN BOTTOM
Structure of ocean floor in relation to conditions for formation of lithosphere N84-30484
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 1: Executive summary
[PB84-187939] N84-30639
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 2: Mid-Atlantic region
[PB84-187947] N84-30640
Undersea acoustic research
[AD-A142339] N84-30891
King's Trough Flank: Geological and geophysical investigations of its suitability for high-level radioactive waste disposal
[IOS-166] N84-30950
OCEAN CURRENTS
Oceanic transport N84-30444
Ocean circulation studies N84-30469
USSR report: Earth sciences
[JPRS-UES-84-006] N84-30479
Propagating long waves on oceanic density fronts: An analytic model
[AD-A141915] N84-30628
Preliminary report of HF radar measurements of surface currents east of the Strait of Gibraltar near Marbella, Spain, 7-22 October 1982, part 2
[PB84-183864] N84-30637
OCEAN DATA ACQUISITIONS SYSTEMS
Wave force investigations at the second Christchurch Bay Tower
[NMI-R177] N84-30626
OCEAN DYNAMICS
Oceanic transport N84-30444
Sea ice N84-30446
OCEAN MODELS
Sea ice N84-30446
Mechanisms of interannual ocean-atmosphere interactions
[NASA-CR-173834] N84-30595
Propagating long waves on oceanic density fronts: An analytic model
[AD-A141915] N84-30628
A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979
[AD-A142548] N84-30631
OCEAN SURFACE
Nordsee radar backscatter measurements data report
[AD-A141914] N84-30148
Research activities of the Geodynamics Branch
[NASA-TM-86123] N84-30455
Ocean circulation studies N84-30469
Global mean sea surface based upon SEASAT altimeter data N84-30470
Interpreting spectra of sea surface aerial photographs
N84-30494
US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141810] N84-30627
Interannual variability in sea-surface temperature at one location along the central California coast
[AD-A142553] N84-30632
Summary of SAR (Synthetic Aperture Radar) ocean wave data archived at ERIM (Environmental Research Institute of Michigan)
[AD-A142620] N84-30633
OCEAN TEMPERATURE
Oceanic transport N84-30444
A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979
[AD-A142548] N84-30631
Interannual variability in sea-surface temperature at one location along the central California coast
[AD-A142553] N84-30632
OCEAN THERMAL ENERGY CONVERSION
Ocean Energy Technology Program
[DE84-012052] N84-30542
Shelf mounted ocean thermal energy conversion platform, revised preliminary report
[PB84-185230] N84-30551
Geotechnical and geologic design considerations for a shelf mounted OTEC (Ocean Thermal Energy Conversion) facility
[PB84-186147] N84-30554

OCEANOGRAPHY
Earth Observing System. Volume 1, part 2: Science and mission requirements. Working group report appendix
[NASA-TM-86129] N84-30433
Biological oceanography N84-30437
Oceanic transport N84-30444
Sea ice N84-30446
USSR report: Earth sciences
[JPRS-UES-84-006] N84-30479
Results of ocean-atmosphere interaction studies in West Atlantic N84-30481
Spatial distribution of advective heat influxes in atmosphere over Northern Hemisphere and its relationship to heat influxes from ocean N84-30482
A description of the MIZEX 1984 remote sensing activities
[AD-A142296] N84-30514
Continental shelf processes affecting the oceanography of the South Atlantic Bight
[DE84-010113] N84-30635
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1960-1982. Volume 1: Executive summary
[PB84-187939] N84-30639
Environmental geologic studies on the United States mid-and north Atlantic outer continential shelf area, 1960-1982. Volume 3: North Atlantic region
[PB84-187954] N84-30641
Undersea acoustic research
[AD-A142339] N84-30891

OCEANS
Sea ice N84-30446
SEASAT observations of lithospheric flexure N84-30463
Ocean circulation studies N84-30469
Global mean sea surface based upon SEASAT altimeter data N84-30470
Spatial distribution of advective heat influxes in atmosphere over Northern Hemisphere and its relationship to heat influxes from ocean N84-30482
Ocean Energy Technology Program
[DE84-012052] N84-30542

OFFSHORE PLATFORMS
Wave uplift pressure on horizontal platforms
[PB84-190628] N84-30257
Shelf mounted ocean thermal energy conversion platform, revised preliminary report
[PB84-185230] N84-30551
Wave force investigations at the second Christchurch Bay Tower
[NMI-R177] N84-30626

OILS
Some considerations on silicone oil in high-current and energy-disconnecting mechanisms
[DE84-011021] N84-30203

ON-LINE SYSTEMS
Omnidirectional fiber optic tiltmeter
[DE84-011109] N84-30959

ONBOARD EQUIPMENT
Cabin air quality
[GPO-29-522] N84-30702

OPERATIONAL PROBLEMS
EValuation of a 96V EV 1000 battery pack at temperature extremes
[PB84-187723] N84-30217
Evaluation of an 96V ALCO 2200 battery pack at temperature extremes
[PB84-187731] N84-30219

OPERATOR PERFORMANCE
Man-machine systems group
[WTHD-161] N84-30703
Summaries of doctorate theses — man machine systems N84-30705
Modeling the human operator's supervising behavior — industrial plants N84-30707
A utility plant simulator for control room experiments N84-30708
Human reliability analysis using event trees
[S/T-REPT-VOL-1-NO-3] N84-30718

OPERATORS (PERSONNEL)
Operating system interface for Ada (trademark) instructors
[AD-P003433] N84-30765

OPTICAL COMMUNICATION
Strategic blue-green communication filters
[AD-A142353] N84-30151
Nonlinear real-time optical signal processing
[AD-A142619] N84-30956

OPTICAL DATA PROCESSING
Phase conjugate optics
[AD-A141960] N84-30951
Switchable zero order diffraction gratings as light valves
[AD-A142513] N84-30953
Nonlinear real-time optical signal processing
[AD-A142619] N84-30956

OPTICAL MEASURING INSTRUMENTS
Optical support Hartmann sensor optical simulation
[AD-A142525] N84-30955

OPTICAL PROPERTIES
Theory of the electronic structure and optical properties of organic solids: Exciton effects
[AD-A142544] N84-29993
Capillary separations with calorimetric absorbance detection
[DE84-012466] N84-30291
Performance tests of the Solar Steam, Incorporated, 9-m deep-dish solar concentrating collector
[DE84-000079] N84-30535
Intelligent optical design program
[DE84-010071] N84-30813
Impact of laser radiation on optical properties of polymer liquid crystal in phase transition range N84-30868
Optical second-harmonic generation for surface studies
[DE84-010718] N84-30958

OPTICAL PUMPING
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer N84-30865

OPTICAL RESONANCE
Resonance absorption of narrow-band laser radiation by atmospheric gases N84-30493

OPTICAL SCANNERS
Application of FASTRAK by Skandinavisk Autodigitaliserings AB (SADAB) cartographic service N84-30498

OPTICS
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862

OPTIMAL CONTROL
Modeling the human operator's supervising behavior — industrial plants N84-30707
State estimation and control of conditionally linear systems
[AD-A142455] N84-30826
Asymmetric Weiner-Poisson control
[AD-A142452] N84-30848

OPTIMIZATION
Optimization of electromagnetic propulsion systems N84-29929
Dynamic powder compaction
[DE84-006133] N84-30132
Testament of general boundary conditions and point-wise state variable constraints in optimum design for static and dynamic response
[PB84-192749] N84-30356
Boolean computation of optimum hitting sets
[DE84-012920] N84-30842
A steady-state version of a dynamic optimal budgeting problem
[AD-A142281] N84-31034

ORBIT CALCULATION
Geodyn systems development N84-30467

ORBIT MANEUVERING ENGINE (SPACE SHUTTLE)
The space transportation system reaction control system and orbital maneuvering subsystem N84-29908
Iron nitrate and MON-3 nitrogen tetroxide N84-29909
Shuttle payload improvement by low risk modifications to the OMS engine N84-29925

ORBIT TRANSFER VEHICLES
Propulsion issues for advanced orbit transfer vehicles N84-29937

ORBITAL MANEUVERING VEHICLES
OMV: A simplified mathematical model of the orbital maneuvering vehicle
[NASA-CR-171123] N84-29902

ORBITAL MECHANICS
Qualitative study of the planar isosceles three-body problem
[PREPRINT-35] N84-29896
Tracking and Data Relay Satellite launch recovery mission N84-29918
Observational requirements and measurement systems concepts N84-30452
Research activities of the Geodynamics Branch
[NASA-TM-86123] N84-30455

ORBITS
Qualitative study of the planar isosceles three-body problem
[PREPRINT-35] N84-29896
An overview of LANDSAT-4 and the Thematic Mapper N84-30364

ORDER-DISORDER TRANSFORMATIONS
Vibrational studies of the structure of disordered solids
[AD-A142297] N84-30338

ORGANIC COMPOUNDS
Evaluation of sampling methods for gaseous atmospheric samples
[PB84-190735] N84-30012
Laboratory for Energy Related Health Research
[DE84-000529] N84-30672

ORGANIC SOLIDS
Theory of the electronic structure and optical properties of organic solids: Exciton effects
[AD-A142544] N84-29993

ORGANIZATIONS
A field study of Air Force organization structures
[AD-A142389] N84-31035
Government acronyms and alphabetic organizational designations used in DTIC (Defense Technical Information Center)
[AD-A142700] N84-31049

ORGANOMETALLIC POLYMERS
Characterization of organometallic polymers by chromatographic methods and nuclear magnetic resonance, part 2
[PB84-183599] N84-30100

ORTHOGONALITY
Nulling in array patterns with orthogonal analytic cancellation beams
[AD-A142719] N84-30188
A numerical algorithm for chained aggregation and modified chained aggregation
[AD-A142394] N84-30822

ORTHOSTATIC TOLERANCE
USSR report: Space Biology and Aerospace Medicine, vol. 18, no. 3, May - June 1984
[JPRS-USB-84-005] N84-30642
Effect of dihydroergotamine on human circulation during orthostatic tests N84-30646
Circulatory changes in orthostatic position in the presence of hyperthermia N84-30647
Human stomach motor and evacuatory functions during antiorthostatic hypokinesia N84-30649

OSCILLATIONS
The 19th Moriond meeting: Summary talk
[DE84-010053] N84-31072

OSCILLATORS
Free electron lasers and related topics
[DE84-011332] N84-30277
Electron beam diagnostic for the Los Alamos free electron laser oscillator experiment
[DE84-011348] N84-30278
The XUV/VUV free-electron laser oscillator
[DE84-011347] N84-30279

OSMIUM COMPOUNDS
Karnovsky-osmium as a primary fixative for electron microscopy
[AD-A142671] N84-30957

OSMOSIS
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682

OVERPRESSURE
NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures
[AD-A142290] N84-30337

OXIDATION
Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti
[DE84-005411] N84-30043
Application of transverse-section analytical electron microscopy to the study of oxidation of metal alloys
[DE84-006415] N84-30049
High-temperature lubricants for minimum-cooled diesel engines
[AD-A142426] N84-30078
Sulfidation- and oxidation-resistant ferritic stainless steel containing aluminum
[PB84-189521] N84-30101
HgCdTe surface and defect study program
[AD-A142342] N84-31010

OXIDATION RESISTANCE
Improved oxidation sulfidation resistance of Fe-Cr-Ni alloys
[DE84-010066] N84-30039

OXIDATION-REDUCTION REACTIONS
Solvent, ligand, and ionic charge effects on reaction entropies for simple transition-metal redox couples
[AD-A142374] N84-29984
The reliability of standard rate constants for rapid electrochemical reactions
[AD-A142445] N84-29989

OXIDES
Formation of dispersions of rare earth oxides in titanium alloys using rapid solidification processing
[DE84-006664] N84-30048

OXIDIZERS
Iron nitrate and MON-3 nitrogen tetroxide N84-29909

OXYGEN
Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884

OXYGEN ATOMS

A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30568

OXYGEN BREATHING

Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654

OXYNITRIDES

Joining silicon nitride based ceramics: A technical assessment
[DE84-011356] N84-30092

OZONE

Operation and maintenance of selected ozone and ultraviolet disinfection systems
[PB84-180124] N84-30719

P

P-1 ENGINE

Analysis of particulates in the exhaust plume of a TF30 engine at military power
[AD-A142510] N84-29882

PACIFIC OCEAN

A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979
[AD-A142548] N84-30631

PAIN

Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657

PALEONTOLOGY

Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada
[DE84-009032] N84-30610

PALLADIUM

The role of sintering in the oxidation-reduction of palladium powders
[DE84-011202] N84-30059

PALMGREN-MINER RULE

A tractable theory for nonlinear propellant response and cumulative damage predictions N84-29950

PANAMA CANAL ZONE

Panama Canal Fog Navigation Study: Candidate system definition
[PB84-180793] N84-30624

Panama Canal Fog Navigation Study: System requirements statement
[PB84-179811] N84-30625

PANELS

Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970

Tensile strength of composite sheets with unidirectional stringers and crack-like damage N84-29974

Postbuckling behavior of graphite-epoxy panels N84-29976

Studies of noise transmission in advanced composite material structures N84-29977

PAPER (MATERIAL)

Survey and analysis of materials research and development at selected federal laboratories
[DE84-008904] N84-29967

PARABOLIC DIFFERENTIAL EQUATIONS

Modified 5-point and 9-point schemes for the solution of the Vorticity- transport equation with cross derivatives
[AD-A142720] N84-30851

PARALLEL PROCESSING (COMPUTERS)

Current research in parallel microprocessing systems at Los Alamos
[DE84-011342] N84-30804

On the design of a Pipelined/Systolic finite element system
[AD-A142558] N84-30830

Nonlinear real-time optical signal processing
[AD-A142619] N84-30956

Inductive information retrieval using parallel distributed computation
[AD-A142712] N84-31050

PARALLEL PROGRAMMING

Design issues in parallel architectures for artificial intelligence
[AD-A142482] N84-30809

Inductive information retrieval using parallel distributed computation
[AD-A142712] N84-31050

PARALYSIS

Information processing for use in the treatment of severely physically handicapped persons N84-30711

PARAMETER IDENTIFICATION

Flight investigation of various control inputs intended for parameter estimation
[NASA-TM-85901] N84-29884

Approximation techniques for parameter estimation and feedback control for distributed models of large flexible structures
[NASA-CR-172411] N84-29903

System identification of structures with joint rotation
[PB84-192210] N84-30357

Geodyn systems development N84-30467

Input-output parametric models for nonlinear systems. Part 1: Deterministic nonlinear systems
[RR-251-PT-1] N84-30844

Input-output parametric models for nonlinear systems. Part 2: Stochastic nonlinear systems
[RR-252-PT-2] N84-30845

PARAMETERIZATION

Input-output parametric models for nonlinear systems. Part 1: Deterministic nonlinear systems
[RR-251-PT-1] N84-30844

PARSING ALGORITHMS

An algorithm for parsing flow graphs
[AD-A142440] N84-30773

PARTIAL DIFFERENTIAL EQUATIONS

Control theory of partial differential equations
[AD-A142636] N84-30812

Analysis and control of a class of stiff linear distributed systems
[AD-A142364] N84-30821

On the extremum of bilinear functional for hyperbolic type partial differential equations
[AD-A142505] N84-30828

Moving finite elements in 2-D. Technical report: Year 3
[DE84-008551] N84-30840

Asymmetric Weiner-Poisson control
[AD-A142452] N84-30848

PARTICLE ACCELERATION

Elementary principles of linear accelerators
[DE84-007911] N84-30913

The galactic acceleration of ultrahigh energy cosmic rays
[DE84-012442] N84-31080

Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

PARTICLE ACCELERATOR TARGETS

Modeling the interaction of high power ion or electron beams with solid target materials
[DE84-009126] N84-30931

PARTICLE ACCELERATORS

A 6.5 Tesla SSC lattice example
[DE84-010719] N84-30858

Comparison of some SSC beam parameters for pp and anti pp
[DE84-010729] N84-30908

Observed current enhancement with propagation of the ETA electron beam in air
[DE84-010556] N84-30909

New directions in linear accelerators
[DE84-011412] N84-30911

A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912

IEEE Transactions on Nuclear Science. Volume NS-30, no. 4, part 2: 1983 Particle Accelerator Conference
[DE84-007400] N84-30914

Hypernuclear research at the AGS
[DE84-010282] N84-30915

Accelerator-based atomic physics experiments with photon and ion beams
[DE84-010789] N84-30926

Transverse field focused system
[DE84-011070] N84-30942

PARTICLE ENERGY

Energy-resolving carbon resistance probes for plasma edge characterization
[DE84-012235] N84-30997

PARTICLE INTERACTIONS

Excitation of sound by light N84-30863

Indiana University Theoretical Particle Physics Group
[DE84-010593] N84-30903

Nuclear and particle physics aspects of hyperon and antinucleon interactions
[DE84-010793] N84-30905

Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

PARTICLE MOTION

The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas
[IPPJ-676] N84-30964

PARTICLE SIZE DISTRIBUTION

A theoretical and experimental study of turbulent nonevaporating sprays
[NASA-CR-174668] N84-29877

Analysis of particulates in the exhaust plume of a TF30 engine at military power
[AD-A142510] N84-29882

PARTICLE THEORY

Research program in elementary particle theory
[DE84-011502] N84-30933

PARTICLES

Void-particulate director
[DE84-011300] N84-30262

Partitioning of toxic trace metals between solid and liquid phases in the Great Lakes
[PB84-177849] N84-30525

PATTERN RECOGNITION

LANDSAT scene-to-scene registration accuracy assessment N84-30405

An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414

Suggestion for a cartographic pattern recognition system using digital raster data processing methods N84-30509

PAVEMENTS

Microprocessor automation for the Dynaflect Deflection Measuring System
[PB84-180413] N84-30135

PAYLOADS

Shuttle payload improvement by low risk modifications to the OMS engine N84-29925

The liquid bipropellant stage concept: Filling the OTV gap N84-29936

PEARLITE

Directional growth of pearlite in Fe-C eutectiod alloys
[DE84-007368] N84-30042

PELTIER EFFECTS

Use of Peltier effect for small signal amplification and conversion N84-30864

PENETRATION

Ground penetrating radar: A review of its application in the mining industry, information circular 1984
[PB84-178292] N84-30172

The penetration model of Dehn — terminal ballistics
[PML-1984-5] N84-30316

PENNSYLVANIA

An analysis LANDSAT-4 Thematic Mapper geometric properties N84-30392

PERCEPTUAL ERRORS

Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation
[AD-A142554] N84-30160

PERFORATED PLATES

Strains in an elastic plate containing an interference-fit bolt near a free edge
[AR-003-012] N84-30333

PERFORMANCE PREDICTION

PURDU-WINCOF: A computer code for establishing the performance of a fan-compressor unit with water ingestion
[NASA-CR-168005] N84-29875

Measurement techniques for high-power semiconductor materials and devices
[DE84-010425] N84-31016

PERFORMANCE TESTS

Battery test results on Gould GC2-EV200
[DE84-900635] N84-30208

Instrumenting and interpreting the time-varying response of structural systems
[DE84-009067] N84-30346

Thematic Mapper (TM) instrument description N84-30363

Thematic Mapper sensor characteristics N84-30365

Performance tests of the Solar Steam, Incorporated, 9-m deep-dish solar concentrating collector
[DE84-000079] N84-30535

Analysis of computer interactive tests for assigning helicopter pilots to different missions
[AD-A142434] N84-30696

TVA and the electric vehicle
[DE84-900907] N84-31065

PERICLASE

Magnesia refractories produced from chemically modified periclase grains and Mg(OH)2 slurries
[PB84-178979] N84-30099

PERIODIC VARIATIONS

Analysis of the Earth's variable rotation N84-30462

Interannual variability in sea-surface temperature at one location along the central California coast
[AD-A142553] N84-30632

PERSONNEL

Development of a document preparation staff within an office automation environment
[DE84-008649] N84-31041

PERSONNEL DEVELOPMENT

Development of a document preparation staff within an office automation environment
[DE84-008649] N84-31041

PERSONNEL MANAGEMENT
Interaction of human cognitive models and computer-based models in supervisory control
[AD-A142677] N84-30717
Development of a document preparation staff within an office automation environment
[DE84-006649] N84-31041

PERTURBATION
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29981
Some computational aspects of the stability analysis of nonlinear structures
[NLR-MP-82034-U] N84-30351

PERTURBATION THEORY
Implementation of uniform perturbation method for potential flow past axisymmetric and two-dimensional bodies
[NASA-CR-173829] N84-29851
Orbital stability in combined uniform axial and three-dimensional wiggler magnetic fields for free-electron lasers
[NASA-TM-83753] N84-30273

PHASE CHANGE MATERIALS
Study of latent heat storage system used heat pipes for cooling of underground cables N84-30127

PHASE CONJUGATION
Phase conjugate optics
[AD-A141960] N84-30951
Two novel plasma diagnostics — single mode optical fiber sensors and phase conjugation in nonlinear optics
[DE84-009970] N84-30990

PHASE SHIFT
Propagation loss in electrostatically variable SAW delay lines
[AD-A142433] N84-30183

PHASE SHIFT KEYING
Performance of digital communications over selective fading channels
[AD-A142427] N84-30158

PHASE TRANSFORMATIONS
New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30866
Impact of laser radiation on optical properties of polymer liquid crystal in phase transition range N84-30868

PHASED ARRAYS
Nulling in array patterns with orthogonal analytic cancellation beams
[AD-A142719] N84-30188

PHOSPHATES
Alkali-free phosphate glasses for high temperature, high electrical resistivity applications
[DE84-011533] N84-30091

PHOSPHORESCENCE
Solid surface luminescence analysis
[DE84-011254] N84-31022

PHOTOCHEMICAL REACTIONS
Free electron lasers and related topics
[DE84-011332] N84-30277
Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922

PHOTOCONDUCTIVITY
Electronics Division research and development
[DE84-011024] N84-30200
Impact of weak electric field on photoconductivity of modified vitreous As2Se3 N84-30867

PHOTOELECTRIC EMISSION
Photoemissive materials for 0.35 Micron laser fiducials in X-ray streak cameras
[DE84-008348] N84-30283
Transient response of GaAs microwave power FET to X-ray pulses
[DE84-010145] N84-31017
Photoemission studies of mixed valent systems
[DE84-010797] N84-31020

PHOTOELECTROCHEMICAL DEVICES
The photoelectrochemistry of conducting polymers
[DE84-010889] N84-30093

PHOTOELECTROCHEMISTRY
Photoelectrochemistry at iron oxide electrodes
[DE84-011453] N84-30003
The photoelectrochemistry of conducting polymers
[DE84-010889] N84-30093

PHOTOELECTRON SPECTROSCOPY
Photoemission studies of mixed valent systems
[DE84-010797] N84-31020

PHOTOELECTRONS
Photoelectron studies of excited molecular states: H2 C (1)PI(sub u) and N2 o3 (1)PI(sub u)
[DE84-006663] N84-30917

PHOTOGEOLOGY
Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results — Death Valley, California, Cement-Velma, Oklahoma; Big Horn and Wind River Basins, Wyoming; Spanish Peaks, Colorado; and the Four Corners area (Paradox Basin of Utah and Colorado) N84-30412
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416

PHOTOINTERPRETATION
Spatial resolution estimation of LANDSAT-4 TM data N84-30394
A concept for the processing and display of Thematic Mapper data N84-30417
Forest environments N84-30439

PHOTOIONIZATION
Photoionization investigation of iodine molecules and clusters in a supersonic molecular beam
[AD-A142645] N84-30901
Photoelectron studies of excited molecular states: H2 C (1)PI(sub u) and N2 o3 (1)PI(sub u)
[DE84-006663] N84-30917
Photoionization of excited molecular states using multiphoton excitation techniques
[DE84-004034] N84-30925

PHOTOMAPPING
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416

PHOTOMETRY
The occultation of AG+29 deg 398 by 98 Minerva
[NASA-CR-173827] N84-31066

PHOTON BEAMS
Accelerator-based atomic physics experiments with photon and ion beams
[DE84-010789] N84-30928

PHOTONS
Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922
Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

PHOTORECONNAISSANCE
Global biogeochemistry: An overview N84-30435

PHOTOSYNTHESIS
Investigation of the structure of photosynthetic reaction centers
[DE84-012475] N84-30005
Salinity and temperature effects on photosynthesis and organic carbon release rates by selected benthic macroalgae
[PB84-163146] N84-30674

PHOTOVOLTAIC CELLS
Photovoltaic concentrators: Present status and future role
[DE84-005520] N84-30532
Photovoltaics: Electricity from Sunlight, five-year research plan, 1984-1988
[DE84-010679] N84-30544

PHOTOVOLTAIC CONVERSION
Photovoltaics: Electricity from Sunlight, five-year research plan, 1984-1988
[DE84-010679] N84-30544

PHOTOVOLTAIC EFFECT
Photovoltaic-electrolyzer system transient simulation results
[DE84-010217] N84-29995
Technical and cost potential for lightweight, stretched-membrane heliostat technology
[DE84-004433] N84-30543

PHYSIOLOGICAL EFFECTS
Circadian pattern of simian functional parameters during hypokinesia and in the recovery period N84-30650
Dynamics of red blood cell changes in rats during acute immobilization N84-30651
Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652
Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654
Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere N84-30655
Individual distinctions of human sleeping respiration at altitude of 4200 meters N84-30663
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678
Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682

Preliminary result of our new Nationwide Evaluation of X-ray Trends (NEXT) program for Italy
[ISS-L-84/3] N84-30693

PHYSIOLOGICAL FACTORS
Increase in whole-body peripheral vascular resistance during three hours of air or oxygen prebreathing
[NASA-TM-58261] N84-30684

PHYSIOLOGICAL RESPONSES
Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation
[AD-A142554] N84-30160

PICOSECOND PULSES
New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30866

PIEZOELECTRICITY
Switchable zero order diffraction gratings as light valves
[AD-A142513] N84-30953

PILOT PERFORMANCE
Horizontal diplopia thresholds for head-up displays
[AD-A141965] N84-29872
Analysis of computer interactive tests for assigning helicopter pilots to different missions
[AD-A142434] N84-30696
The measurement of pilot performance: A master-journeyman approach
[AD-A142457] N84-30698

PILOT TRAINING
Analysis of computer interactive tests for assigning helicopter pilots to different missions
[AD-A142434] N84-30696

PINS
Effects of water-vapor on friction and deformation of polymeric magnetic media in contact with a ceramic oxide
[NASA-TM-83727] N84-30072

PIONS
Pion elastic and inelastic scattering from (40) (42) (44) (48)Ca and (54)Fe
[DE84-009080] N84-30927

PIPE FLOW
Thermal laminarization of a stratified pipe flow
[DE84-006407] N84-30236
Experiments on tubes conveying fluid
[DE84-004031] N84-30237
Numerical treatment of pipe boundary conditions in two-phase flow
[DE84-006553] N84-30238
Active ultrasonic cross-correlation flowmeters for mixed-phase pipe flows
[DE84-006449] N84-30260

PIPELINES
Parallelism in manipulator dynamics. Revision
[AD-A142515] N84-30299
Reliability analysis for stiff versus flexible piping
[DE84-008325] N84-30344

PIPELINING (COMPUTERS)
On the design of a Pipelined/Systolic finite element system
[AD-A142558] N84-30830

PIPES (TUBES)
J-integral tearing instability analysis for 8-inch diameter ASTM A106 steel pipe
[AD-A142589] N84-30023
Experiments on tubes conveying fluid
[DE84-004031] N84-30237
Stability of tubes conveying fluid
[DE84-010573] N84-30240
Void-particulate director
[DE84-011300] N84-30262
Reliability analysis for stiff versus flexible piping
[DE84-008325] N84-30344
Shock wave absorber having apertured plate
[DE84-011271] N84-30345

PISTON ENGINES
Engineering research on positive displacement gas expanders, phase 1
[DE84-008977] N84-30310

PITCH (INCLINATION)
Passive yaw damping of a teetered rotor versus delta-3 angle values
[DE84-009758] N84-30545

PITTING
Potential-determining reactions during pitting corrosion of aluminum
[DE84-007695] N84-30031

PITUITARY GLAND
Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere N84-30655

PLANAR STRUCTURES
Qualitative study of the planar isosceles three-body problem
[PREPRINT-35] N84-29896

Multi-100kW: Planar low cost solar array development [NASA-CR-171119] N84-30529

PLANETARY TEMPERATURE
Oceanic transport N84-30444

PLANETOLOGY
Projection for space geodynamics, 1986-1996 N84-30477

PLANKTON
Inland aquatic resources and biogeochemical cycles N84-30436
Chesapeake Bay nutrient dynamics study [PB84-190962] N84-30524

PLANT ROOTS
Desert emergency - lack of water - how to find and collect water. Plants and human survival in the desert [AD-A142025] N84-30513

PLANT STRESS
The effect of point-spread function interaction with radiance from heterogeneous scenes on multitemporal signature analysis — soybean stress N84-30400

PLANTS (BOTANY)
Desert emergency - lack of water - how to find and collect water. Plants and human survival in the desert [AD-A142025] N84-30513
NASA space biology accomplishments, 1983-84 [NASA-TM-86654] N84-30664

PLASMA CONTROL
Internal magnetic field measurements in a translating field-reversed configuration [DE84-010054] N84-30654
Calculation of ballistic focusing of ion beams [DE84-012870] N84-30934
Semi-implicit method for three-dimensional compressible MHD simulation [IPP-6/234] N84-30961
Magnetic fusion energy plasma interactive and high heat flux components. Volume 1: Technical assessment of the critical issues and problem areas in the plasma materials interaction field [DE84-011527] N84-30969
Electron cyclotron radiation from mirror-confined plasma [DE84-008665] N84-30970
Equilibrium and stability of the Los Alamos spheromak [DE84-010064] N84-30975
Steady state compact toroidal plasma production [DE84-011090] N84-30977
Theoretical studies of Elma Bumpy Torus (EBT) [DE84-010814] N84-30978
Plasma Fusion Center technical research programs [DE84-007954] N84-30983
Space resolved absolutely calibrated VUV spectroscopic measurements on CTX [DE84-007490] N84-30984
Confinement time and energy balance in the CTX spheromak [DE84-007491] N84-30987
Theoretical aspects of mirror fusion [DE84-009139] N84-30988
Magnetohydrodynamic equilibrium and stability of stellarators [DE84-010731] N84-30994
RF-induced stability and transport in axisymmetric tandem mirrors [DE84-010842] N84-30999
Interaction of the precessional wave with free-boundary Alfven surface waves in tandem mirrors [DE84-012527] N84-31003

PLASMA CURRENTS
Analysis of surface currents on the CTX mesh flux conserver [DE84-007491] N84-30989

PLASMA CYLINDERS
Finite-element-analysis of fields radiated from ICRF antenna [IPPJ-675] N84-30965

PLASMA DECAY
Kolmogorov-style argument for the decaying homogeneous MHD turbulence [IPPJ-677] N84-30963

PLASMA DENSITY
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma [IPPJ-674] N84-30966
Density variation due to wave heating in Tokamak plasmas [DE84-009402] N84-30993
A new model of Raman spectra in laser produced plasma [DE84-012487] N84-31005

PLASMA DIAGNOSTICS
Diagnostics of a high current capillary discharge [DE84-011369] N84-30194
High resolution, high rate X-ray spectrometer [DE84-011116] N84-30266
Holographic interferometry using 20-picosecond UV pulses to obtain time resolved hydro measurements of selenium and gold plasmas [DE84-009485] N84-30269
Photoemissive materials for 0.35 Micron laser fiducials in X-ray streak cameras [DE84-008348] N84-30283
Report on the experience with the Supervisory Control and Diagnostics System (SCDS) of MFTF-B [DE84-012599] N84-30807
Internal magnetic field measurements in a translating field-reversed configuration [DE84-010054] N84-30854
Observed current enhancement with propagation of the ETA electron beam in air [DE84-010556] N84-30909
Accelerator-based atomic physics experiments with photon and ion beams [DE84-010789] N84-30928
Magnetic fusion energy plasma interactive and high heat flux components. Volume 1: Technical assessment of the critical issues and problem areas in the plasma materials interaction field [DE84-011527] N84-30969
VUV instrument calibrations for laser-plasma studies [DE84-010507] N84-30974
Space resolved absolutely calibrated VUV spectroscopic measurements on CTX [DE84-007490] N84-30984
Two novel plasma diagnostics — single mode optical fiber sensors and phase conjugation in nonlinear optics [DE84-009970] N84-30990
Rotation and impurity transport in a Tokamak plasma with directed neutral beam injection [DE84-008014] N84-30996
Energy-resolving carbon resistance probes for plasma edge characterization [DE84-012235] N84-30997
Experimental observation of the shear Alfven resonance in a Tokamak [DE84-012993] N84-30998
Studies of CO2 laser interactions with plasma [DE84-012485] N84-31004

PLASMA DRIFT
Drift scintillation meter [AD-A142523] N84-30968

PLASMA DYNAMICS
Dynamics of plasma corona on spherical targets irradiated by laser N84-30878

PLASMA GUNS
Steady state compact toroidal plasma production [DE84-011090] N84-30977

PLASMA HEATING
Electron velocity distributions near collisionless shocks [DE84-011352] N84-30235
Calculation of ballistic focusing of ion beams [DE84-012870] N84-30934
Theoretical studies of Elma Bumpy Torus (EBT) [DE84-010814] N84-30978
Linear theory of lower hybrid heating [DE84-010577] N84-30979
Lower hybrid experiments at the 1 MW level on Alcator C: Heating and current drive [DE84-010586] N84-30981
Ohmic heating to 100-eV and helicity injection in CTX [DE84-007494] N84-30986
Density variation due to wave heating in Tokamak plasmas [DE84-009402] N84-30993

PLASMA INTERACTIONS
Acceleration of ions and electrons by wave-particle interactions [AD-A142341] N84-30900
The gas-heating phase in electrical breakdown [AD-A141961] N84-30967
RF-induced stability and transport in axisymmetric tandem mirrors [DE84-010842] N84-30999

PLASMA OSCILLATIONS
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma [IPPJ-674] N84-30966

PLASMA PHYSICS
Plasma in diverter during intense recycling N84-30877
IEEE Transactions on Nuclear Science. Volume NS-30, no. 4, part 2: 1983 Particle Accelerator Conference [DE84-007400] N84-30914
Microstability theory for distributions separable in energy and pitch angle [DE84-009683] N84-30991
Nonlocal heat transport by non-Maxwellian electrons [DE84-012391] N84-31000

PLASMA PROPULSION
An MPD thruster with liquid metal injection [ISAS-610] N84-30103

PLASMA RESONANCE
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma [IPPJ-674] N84-30966
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas [DE84-012396] N84-31002

PLASMA WAVES
Plasma simulation studies of electron acceleration for beat wave and single frequency-laser heating schemes [DE84-009966] N84-30992
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas [DE84-012396] N84-31002

PLASMA-ELECTROMAGNETIC INTERACTION
First observations of 140 MHz plasma line backscatter during healthy experiments at Tromsoe [UIO-SR-84-02] N84-30588

PLASMAS (PHYSICS)
Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30861
Impurity characteristics of TMX-U [DE84-012413] N84-30932
The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas [IPPJ-676] N84-30964
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma [IPPJ-674] N84-30966
Electron cyclotron radiation from mirror-confined plasma [DE84-008665] N84-30970
Mixed mode operation in CTX [DE84-007493] N84-30985
Microstability theory for distributions separable in energy and pitch angle [DE84-009683] N84-30991
Density variation due to wave heating in Tokamak plasmas [DE84-009402] N84-30993
RF-induced stability and transport in axisymmetric tandem mirrors [DE84-010842] N84-30999
Nonlocal heat transport by non-Maxwellian electrons [DE84-012391] N84-31000
Interaction of the precessional wave with free-boundary Alfven surface waves in tandem mirrors [DE84-012527] N84-31003
Fractional quantization of the Hall effect [DE84-008894] N84-31023

PLASMASPHERE
Electron velocity distributions near collisionless shocks [DE84-011352] N84-30235
Geophysical plasmas and atmospheric modeling [AD-A142573] N84-30572
The Earth's radiation belts [AD-A142673] N84-30574

PLASMONS
Experiments and theory on half-harmonic light and 2-plasmon decay [DE84-008945] N84-30276

PLASTIC DEFORMATION
Effects of water-vapor on friction and deformation of polymeric magnetic media in contact with a ceramic oxide [NASA-TM-83727] N84-30072
Elastic-plastic deformation of pulse-loaded structures [AD-A142350] N84-30339

PLASTICIZERS
Synthesis of diazidodiesters N84-29956

PLASTICS
Characterization of the microstructures of various materials [AD-A141946] N84-30017

PLATES
Postbuckling behavior of graphite-epoxy panels N84-29976
Solving crack problems with analytical techniques and the finite elements method [BLL-RISLEY-TR-4940-(9091.9F)] N84-30325
Thermoacoustic couple [DE84-011296] N84-30895

PLATES (STRUCTURAL MEMBERS)
Shock wave absorber having apertured plate [DE84-011271] N84-30345

PLATES (TECTONICS)
Update: San Andreas Fault experiment N84-30456

PLOTTING
GRAPH 2: A digitizing and graph plotting program [DE84-010747] N84-30834

PLUGS
Experimental study on porous-plug phase separator for superfluid He2 [ISAS-612] N84-31008

PLUMES
In-stream distribution and hydraulic and ecological effects of volcanic ash from Mount St. Helens eruption
[PB84-169382] N84-30526
Analytical modeling of random thermal fluctuations in the NORDA (Naval Ocean Research and Development Activity) high-frequency sound scattering facility
[AD-A142520] N84-30630

POINCARE PROBLEM
Spinorial relativistic rotator: The transformation from quasi-Newtonian to Minokowski coordinates
[DE84-009091] N84-30839

POINT SPREAD FUNCTIONS
The effect of point-spread function interaction with radiance from heterogeneous scenes on multitemporal signature analysis — soybean stress N84-30400

POISONING (REACTION INHIBITION)
Effects of H2S on molten carbonate fuel cells
[DE84-010485] N84-30531

POISSON EQUATION
Elliptic grid generation for three-dimensional geometries N84-30117
Lyapunov stability conditions for a relativistic multifluid plasma
[DE84-010004] N84-30973

POLAR METEOROLOGY
Polar glaciology N84-30445

POLAR ORBITS
Global hydrologic cycle N84-30434

POLAR REGIONS
Polar glaciology N84-30445

POLARIZATION (SPIN ALIGNMENT)
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer
N84-30865
New approach to polarized proton scattering based on Dirac dynamics
[DE84-008018] N84-30926

POLARIZATION CHARACTERISTICS
Polarization of paraexciton luminescence in Cu2O crystals in magnetic field N84-30870

POLARIZED LIGHT
Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884

POLICIES
Federal Aviation Administration's system for prioritizing airport grants
[PB84-181650] N84-29893
Policy implications of information technology
[PB84-183219] N84-31060
National Science Foundation, volume 1
[PB84-193234] N84-31061
Land Remote-Sensing Commercialization Act of 1984
[H-REPT-98-647] N84-31063

POLISHING
Study of mechano-chemical machining of ceramics and the effect on thin film behavior
[AD-A142542] N84-30080

POLLUTION CONTROL
Anti-tampering and anti-misfueling programs to reduce in-use emissions from motor vehicles
[PB84-185222] N84-30559

POLLUTION MONITORING
Sampling report for the study of personal CO (carbon monoxide) exposure
[PB84-181957] N84-30560

POLLUTION TRANSPORT
Scientific analysis of existing data on aerosol dispersion and transport in a mountain valley
[AD-A142013] N84-30555

POLYBUTADIENE
Durability of adhesive bonds with ionic bonds at the interface — propellant binder adhesion N84-29960

POLYCRYSTALS
Study of mechano-chemical machining of ceramics and the effect on thin film behavior
[AD-A142542] N84-30080
Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884

POLYETHER RESINS
Characterization of block copolymers based on poly(3,3 -bis(ethoxymethyl)oxetane) and other novel polyethers
[AD-A142606] N84-30081

POLYETHYLENES
Kevlar-49/epoxy case skirt structural fatigue strength
N84-29955
Uniaxial draw of poly(ethylene oxide) by solid state extrusion
[AD-A141923] N84-30074

POLYMER CHEMISTRY
Kevlar-49/epoxy case skirt structural fatigue strength
N84-29955

POLYMERIC FILMS
Strategic blue-green communication filters
[AD-A142353] N84-30151

POLYMERIZATION
Electropositive bivalent metallic ion unsaturated polyester complexed polymer concrete
[DE84-011080] N84-29979
The photoelectrochemistry of conducting polymers
[DE84-010889] N84-30093
High energy binders
[AD-A142347] N84-30105

POLYMERS
Non-inertial flow of dilute polymer solutions in a sudden contraction
[BLL-WH-558-(909A.9F)] N84-30221

POLYURETHANE RESINS
Durability of adhesive bonds with ionic bonds at the interface — propellant binder adhesion N84-29960

PONDEROMOTIVE FORCES
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010842] N84-30999

POROSITY
Experimental study on porous-plug phase separator for superfluid He2
[ISAS-612] N84-31008

POROUS MATERIALS
Thin flame model for reactive flow in porous materials
[DE84-011406] N84-30002
Diffusion of gases in porous solids: Simulations and measurements
[DE84-010822] N84-30241
Flow of foam through porous media
[DE84-012410] N84-30246
Propagation of acoustic waves in partially saturated porous media
[DE84-010536] N84-30896

PORPHYRINS
Investigation of the structure of photosynthetic reaction centers
[DE84-012475] N84-30005

PORTABLE EQUIPMENT
Analyzer for determining helium-4 in the part-per-billion range
[PB84-189554] N84-30272
Electric arc saw apparatus
[DE84-006153] N84-30308

POSITION
Selection of elements in process schemes on Cathode Ray Tube (CRT). A comparative study between four types of trackballs
[IZF-1984-4] N84-30213

POSITIVE IONS
Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions
[DE84-011030] N84-30918

POTENTIAL FLOW
Implementation of uniform perturbation method for potential flow past axisymmetric and two-dimensional bodies
[NASA-CR-173829] N84-29851

POWDER (PARTICLES)
Fatigue behavior of long and short cracks in wrought and powder aluminum alloys
[AD-A142609] N84-30024

POWDER METALLURGY
Mechanical properties of a shock consolidated steel powder
[DE84-003573] N84-30056
Dynamic powder compaction
[DE84-006133] N84-30132

POWER LINES
Energy conservative cable system demonstration project
[DE84-008982] N84-30195

POWER SPECTRA
Evolution of structure in the PLACES barium clouds
[DE84-010996] N84-30583

PRECIPITATION (CHEMISTRY)
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557

PREDICTION ANALYSIS TECHNIQUES
Recent applications of the CONTAM 3 computer model to spacecraft propulsion systems N84-29916
A NDT ignition delay predictive tool N84-29958
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985
Evaluation of U.S. Coast Guard forward-looking airborne radars
[AD-A142417] N84-30156
The evaluation of prediction models for microwave attenuation by rainfall
[PB84-182104] N84-30170
An integral prediction method for three-dimensional flow separation
[AD-A142551] N84-30231
Techniques for fatigue life predictions from measured strains
[NASA-CR-171118] N84-30334
Local bond stress-slip relationships of deformed bars under generalized excitations: Experimental results and analytical model
[PB84-192848] N84-30355
Interactive computer analysis methods for predicting the inelastic cyclic behaviour of structural sections
[PB84-192012] N84-30358
Spatial resolution estimation of LANDSAT-4 TM data
N84-30394
National Weather Service hurricane probability program
[PB84-182757] N84-30619
A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979
[AD-A142548] N84-30631
Human reliability analysis using event trees
[S/T-REPT-VOL-1-NO-3] N84-30718
Proton-induced single event upsets in 71 Earth-satellite environments
[AD-A142435] N84-30771
New approach to polarized proton scattering based on Dirac dynamics
[DE84-008018] N84-30926
Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30980

PREDICTIONS
A theoretical and experimental study of turbulent nonevaporating sprays
[NASA-CR-174688] N84-29877
Tropospheric science N84-30447
Prediction of slant wind shear with an offset tower observation system
[AD-A142676] N84-30600

PREPOLYMERS
Nitrate ester polyether glycol prepolymers
N84-29947

PRESERVATIVES
Karnovsky-osmium as a primary fixative for electron microscopy
[AD-A142671] N84-30957

PRESSURE BREATHING
Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654

PRESSURE CHAMBERS
Effect of high ammonia content in pressure chamber atmosphere on human adrenocortical system function
N84-30658

PRESSURE DEPENDENCE
An assessment of methods of geological basin analysis for application to the Uinta and Piceance Basins
[DE84-012369] N84-30581

PRESSURE DISTRIBUTION
Simulation of physiological effects of negative pressure on man N84-30662

PRESSURE EFFECTS
Nonlinear dynamics of magnetic islands with curvature and pressure
[DE84-010968] N84-30859
Confinement time and energy balance in the CTX spheromak
[DE84-007491] N84-30967

PRESSURE MEASUREMENT
Theoretical and measured airflow about the Twin Otter wing
[AD-A141974] N84-29855
Effect of turbulent boundary layer flow on measurement of acoustic pressure and intensity, revised
[AD-A142473] N84-30229
New experimental techniques with the split Hopkinson pressure bar
[DE84-003818] N84-30268
Monthly mean determination of the solar semidiurnal surface pressure oscillation at Batavia from 1866 through 1944
[PB84-184795] N84-30593

PRESSURE PULSES
Calculation of the statistical characteristics of surface
[NASA-TM-77482] N84-30222

PRESSURE REDUCTION
Growth and characterization of metal oxide whiskers for aerosol filtration
[DE84-011049] N84-31021

PRESSURE SENSORS
Stress transducer interpretation analysis and stability data N84-29957

PRESSURE VESSELS
Neutron embrittlement of the reactor vessel in Borssele as determined from Charpy specimens
[S/T-REPT-VOL-1-NO-4] N84-30352
PRINCIPLES
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
PRINTED CIRCUITS
Electronics Division research and development
[DE84-011024] N84-30200
PRINTING
An investigation of the reproduction of the general topographic map 1:200,000 in shortened scale with a digital raster data processing system N84-30505
PRIORITIES
Federal Aviation Administration's system for prioritizing airport grants
[PB84-181650] N84-29893
PROBABILITY THEORY
Flaw detection reliability criteria. Volume 1: Methods and results
[AD-A142001] N84-30320
Sunlight probability data for select cities in the US
[DE84-000006] N84-30605
National Weather Service hurricane probability program
[PB84-182757] N84-30619
PROBLEM SOLVING
Shuttle orbiter main propulsion system hardware development and certification for flight N84-29907
Ada (trademark) tasking in numerical analysis
[AD-P003429] N84-30761
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers exercise guide
[AD-A142429] N84-30767
Two algorithms for the contact problem in elastostatics, 1982
[PB83-147676] N84-30793
Artificial intelligence and robotics
[AD-A142488] N84-30810
Automated planning for intelligent machines in energy-related applications
[DE84-011666] N84-30815
Study of nonlinear singular systems
[AD-A142348] N84-30820
New algorithms for near neighbor searching
[AD-A142404] N84-30824
Moving finite elements in 2-D. Technical report: Year 3
[DE84-008551] N84-30840
Appropriate Technology Small Grants Program evaluation, volume 2
[DE84-010674] N84-31039
PROCESS CONTROL (INDUSTRY)
Man-machine systems group
[WTHD-161] N84-30703
Supervisory control: Introduction and theory — industrial plant control N84-30706
Modeling the human operator's supervising behavior — industrial plants N84-30707
A utility plant simulator for control room experiments N84-30708
Fault management N84-30709
PROCUREMENT
DBMS conversion case study
[DE84-011205] N84-31054
PROCUREMENT MANAGEMENT
DBMS conversion case study
[DE84-011205] N84-31054
PRODUCT DEVELOPMENT
The 8th European Specialist Workshop on Active Microwave Semiconductor Devices 4-6 may 1983
[AD-A142252] N84-30180
Computer science and technology: Introduction to software packages
[NBS-SP-500-114] N84-30740
PRODUCTION ENGINEERING
Low cost manufacturing of tactical rocket motors N84-29959
Precision flexible machining cells within a manufacturing system
[AD-A142527] N84-30129
Initial insights on robotics
[DE84-010768] N84-30302
Integrated Computer-Aided Manufacturing (ICAM) architecture, part 3. Volume 5: Composite function model of manufacture product (MFG0)
[AD-A142337] N84-30766
Artificial intelligence and robotics
[AD-A142488] N84-30810
PRODUCTIVITY
Seeding the Ada (trademark) software components industry
[AD-P003432] N84-30764
PROGRAM VERIFICATION (COMPUTERS)
Modular Computer System, Inc. Modular NASA extended FORTRAN 78 C.1
[PB84-180231] N84-30734
Burroughs Corporation, B5900, large systems COBOL74 3.4.1.
[PB84-181379] N84-30735
Improvements to software maintenance methods in real time embedded aviation flight systems
[AD-A141949] N84-30742
Burroughs Corporation B1000 system interactive, BASIC release 11.0
[PB84-180215] N84-30794
Data General Corporation ECLIPSE MV/8000, MP-BASIC revision 3.00
[PB84-181361] N84-30796
United Information Services, Inc. CDC Cyber 175, super BASIC version 1.0
[PB84-181387] N84-30797
Gould Incorporated, Gould Concept 32/87, COBOL Release 1.4
[PB84-180249] N84-30798
PROGRAMMING LANGUAGES
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers guide
[AD-A142432] N84-30770
Enhancements to the codata definition language
[DE84-010579] N84-30783
Selection of a general purpose language and a real-time language suitable for shipboard data system 3
[PB84-180892] N84-30795
PROJECT MANAGEMENT
Salyut: Soviet steps toward permanent human presence in space
[PB84-181437] N84-29905
The LANDSAT-4 program: An overview N84-30360
Status of the ESA-Earthnet LANDSAT-4 TM ground processing chain N84-30391
Stronger direction needed for the National Earthquake Program
[GAO/RCED-83-103] N84-30570
Program for Regional Observing and Forecasting Services (PROFS)
[PB84-179928] N84-30618
Guideline for computer security certification and accreditation. Category: ADP (Automatic Data Processing) operations. Subcategory: Computer security. Federal information processing standards
[FIPS-PUB-102] N84-30736
Appropriate Technology Small Grants Program evaluation, volume 1: Executive summary
[DE84-010675] N84-31038
Appropriate technology management information system
[DE84-010952] N84-31056
PROJECT PLANNING
Federal Aviation Administration's system for prioritizing airport grants
[PB84-181650] N84-29893
The LANDSAT-4 program: An overview N84-30360
Implementation strategy N84-30453
PROPAGATION MODES
Wave attenuation and mode dispersion in a waveguide coated with lossy dielectric material
[NASA-CR-173820] N84-30145
PROPELLANT BINDERS
Nitrate ester polyether glycol prepolymers N84-29947
PROPELLANT CASTING
Low cost manufacturing of tactical rocket motors N84-29959
PROPELLANT DECOMPOSITION
Combustion of GAP, part 1 N84-29952
PROPELLANT TANKS
The compatibility of MON-3 and 301 cryoformed stainless steel N84-29924
PROPELLANTS
Nitrate ester polyether glycol prepolymers N84-29947
PROPELLER BLADES
Active attenuation of propeller blade passage noise
[NASA-CR-172386] N84-30886
PROPRIOCEPTION
Proprioception — prosthetic devices N84-30714
PROPULSION
The 1984 JANNAF Propulsion Meeting, volume 2
[AD-A143025] N84-29939
PROPULSION SYSTEM CONFIGURATIONS
SSME modifications for on-demand launch vehicles N84-29914
Evolution and flight history of the Defense Meteorological Satellite Program (DMSP) propulsion module N84-29917
Propulsion issues for advanced orbit transfer vehicles N84-29937
The 1984 JANNAF Propulsion Meeting, volume 2
[AD-A143025] N84-29939
Propulsion in a life-saving role for ACES 2 N84-29942
The Stencel S4S ejection seat: A study in new pyrotechnic developments N84-29943
Energy management for crew escape systems N84-29945
PROPULSION SYSTEM PERFORMANCE
Weapons file
[AD-A142506] N84-29867
Recent applications of the CONTAM 3 computer model to spacecraft propulsion systems N84-29916
Evolution and flight history of the Defense Meteorological Satellite Program (DMSP) propulsion module N84-29917
A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919
Optimization of electromagnetic propulsion systems N84-29929
The 1984 JANNAF Propulsion Meeting, volume 2
[AD-A143025] N84-29939
PROSTHETIC DEVICES
Man-machine systems group
[WTHD-161] N84-30703
Evaluation of arm protheses for unilateral amputees N84-30713
Proprioception — prosthetic devices N84-30714
PROTECTION
Design of a safety monitor system for high explosives machining
[DE84-010101] N84-30113
PROTECTIVE COATINGS
Cadmium plating versus other coatings to prevent corrosion
[AD-A142504] N84-30022
Solving corrosion problems with surface analysis
[DE84-008652] N84-30025
PROTON BEAMS
Exploration of phase stability in the surfatron accelerator
[DE84-011416] N84-30280
A 6.5 Tesla SSC lattice example
[DE84-010719] N84-30858
Comparison of some SSC beam parameters for pp and anti pp
[DE84-010729] N84-30908
Elementary principles of linear accelerators
[DE84-007911] N84-30913
PROTON DAMAGE
Proton-induced single event upsets in the SBP9989 microprocessor
[AD-A142448] N84-30724
PROTON IRRADIATION
Delayed effects of proton irradiation in Macaca mulatta. 3: Glucose intolerance
[AD-A142289] N84-30669
PROTON SCATTERING
New approach to polarized proton scattering based on Dirac dynamics
[DE84-008018] N84-30926
PROTONS
Proton-induced single event upsets in the SBP9989 microprocessor
[AD-A142448] N84-30724
Proton-induced single event upsets in 71 Earth-satellite environments
[AD-A142435] N84-30771
PSYCHOLOGICAL EFFECTS
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
PSYCHOLOGICAL TESTS
Speculations on the future of test design
[AD-A142662] N84-30699
PSYCHOMETRICS
Speculations on the future of test design
[AD-A142662] N84-30699
PSYCHOPHYSICS
Computational experiments with a feature based stereo algorithm
[AD-A142549] N84-30687
PULSE COMMUNICATION
Elastic buffers for digital rings
[NPL-DITC-38/84] N84-30143
Performance of digital communications over selective fading channels
[AD-A142427] N84-30158
PULSE DOPPLER RADAR
A computer model for a multiple high PRF pulse Doppler radar
[AD-A142357] N84-30152
PULSE DURATION
Klystron voltage pulse timing experiment
[DE84-011753] N84-30176

Inductively stabilized, long pulse duration transverse discharge apparatus
[DE84-011301] N84-30261

PULSE GENERATORS
Klystron voltage pulse timing experiment
[DE84-011753] N84-30176
Lightning simulator circuit parameters and performance for severe-threat, high-action-integral testing
[DE84-009065] N84-30211

PULSE MODULATION
Radiometric calibration and processing procedure for reflective bands on LANDSAT-4 protoflight Thematic Mapper N84-30366

PULSED LASERS
Pulsed-laser atom-probe studies of surface chemical reactions
[DE84-012811] N84-30007
Computer simulation of the Lasertron
[DE84-012242] N84-30267

PULSES
Elastic-plastic deformation of pulse-loaded structures
[AD-A142350] N84-30339
High-gradient, pulsed operation of superconducting niobium cavities
[DE84-012498] N84-31030

PUMPS
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery
[PB84-184894] N84-30550

PURIFICATION
Purification of nitrogen tetroxide for long-term reliability N84-29920
Survey of the preparation, purity, and availability of silanes
[DE84-000090] N84-30084

PURITY
Method and apparatus for producing high purity silicon
[DE84-011087] N84-30090

PYRIDINES
Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaammineosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands
[AD-A142418] N84-29987
Determination of thermal-degradation rates of some candidate Rankine-cycle organic working fluids for conversion of industrial waste heat into power
[DE84-009585] N84-30304

PYROLYSIS
Combustion of GAP, part 1 N84-29952
Low cost, sprayed CuInSe2 solar cell research
[DE84-010480] N84-30533

Q

Q FACTORS
High-Q open resonator structures with sparse spectrum N84-30876

QUADRUPOLES
Practical aspects of tuning a ringed RFQ
[DE84-011366] N84-30163
General-purpose RFQ design program
[DE84-011327] N84-30165
RFQ radial matching sections and fringe fields
[DE84-011406] N84-30920

QUALIFICATIONS
Qualifications of ultrasonic testing for nuclear inservice inspection applications
[DE84-011899] N84-30323

QUALITY CONTROL
Quality engineering and control
[DE84-011603] N84-30001
Evaluation of sampling methods for gaseous atmospheric samples
[PB84-190735] N84-30012
Quality control analysis of TA-23 glass seals for lithium ambient temperature batteries
[DE84-011719] N84-30094
Operator performance on flat-panel displays with line and cell failures
[AD-A142340] N84-30716
Quality Assurance (QA) procedures for computer software in department 1510
[DE84-012131] N84-30778
SLATEC mathematical subprogram library, version 2.0
[DE84-010750] N84-30782
Software quality assurance programs: Key elements of concern in selected commercial approaches
[DE84-009486] N84-30785

QUANTUM CHROMODYNAMICS
Indiana University Theoretical Particle Physics Group
[DE84-010593] N84-30903

QUANTUM EFFICIENCY
Efficient forward conversion in a Raman generator
[DE84-007466] N84-30285

QUANTUM MECHANICS
Fun with supersymmetric quantum mechanics
[DE84-011329] N84-31031

QUANTUM STATISTICS
Some negative results for avoiding lattice fermionic doubling
[PREPRINT-358] N84-30938

QUANTUM THEORY
Supersymmetric nonlinear sigma models constrained on a noncompact manifold
[PREPRINT-356] N84-30843
Stochastic quantization: Stabilizing quantum models
[REPT-80] N84-31032

QUARKS
Flavor mixing and the six quark model
[USIP-84-06] N84-30940

QUARTZ
Trace analysis in quartz
[AD-A142425] N84-29988
The temperature sensitivity of doubly rotated quartz resonators
[AD-A142537] N84-30186

QUARTZ CRYSTALS
Static frequency-temperature characteristics of doubly rotated quartz
[AD-A142456] N84-31013

QUASARS
Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

QUENCHING (COOLING)
A study of the dependence of microsegregation on critical solidification parameters in rapidly-quenched structures
[AD-A142293] N84-30019

QUEUEING THEORY
Applications of combinatorics to the busy period in several queueing models
[AD-A142492] N84-30850

R

RADAR
F-16 APG-66 fire control radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142075] N84-29874

RADAR CROSS SECTIONS
Evaluation of U.S. Coast Guard forward-looking airborne radars
[AD-A142417] N84-30156

RADAR DETECTION
Ground penetrating radar: A review of its application in the mining industry, information circular 1984
[PB84-178292] N84-30172

RADAR ECHOES
Ground penetrating radar: A review of its application in the mining industry, information circular 1984
[PB84-178292] N84-30172

RADAR EQUIPMENT
F-15 AN/APG-63 radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142071] N84-29873

RADAR IMAGERY
Summary of SAR (Synthetic Aperture Radar) ocean wave data archived at ERIM (Environmental Research Institute of Michigan)
[AD-A142620] N84-30633

RADAR MEASUREMENT
Nordsee radar backscatter measurements data report
[AD-A141914] N84-30148
Range corrections for airborne radar - A joint STARS study
[AD-A142363] N84-30154
Preliminary report of HF radar measurements of surface currents east of the Strait of Gibraltar near Marbella, Spain, 7-22 October 1982, part 2
[PB84-183664] N84-30637

RADAR RANGE
Range corrections for airborne radar - A joint STARS study
[AD-A142363] N84-30154

RADAR SCATTERING
Backscatter measurements on snow covered terrain at 94 GHz — radar
[REPT-4-84] N84-30144
Nordsee radar backscatter measurements data report
[AD-A141914] N84-30148

RADAR TRACKING
A high-resolution target-tracking concept using spectral estimation techniques
[AD-A141921] N84-30149

RADIANCE
Relative radiometric calibration of LANDSAT TM reflective bands — San Francisco, California N84-30374
The effect of point-spread function interaction with radiance from heterogeneous scenes on multitemporal signature analysis — soybean stress N84-30400
Radiometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) data — Vermont N84-30401
Radiometric calibration and geocoded precision processing of LANDSAT-4 Multispectral Scanner products by the Canada Centre for Remote Sensing N84-30404
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder
[NOAA-TM-NESDIS-6] N84-30571

RADIATION BELTS
The Earth's radiation belts
[AD-A142673] N84-30574

RADIATION COUNTERS
Improved gaseous leak detector
[DE84-011295] N84-30265

RADIATION DAMAGE
Proton-induced single event upsets in 71 Earth-satellite environments
[AD-A142435] N84-30771
Characterization of micron-sized, optical coating defects by photothermal deflection microscopy
[DE84-011150] N84-30960
Defect production efficiencies in thermal neutron irradiated copper and molybdenum
[DE84-010993] N84-31018

RADIATION DETECTORS
X-ray beam finder
[DE84-011100] N84-30916

RADIATION EFFECTS
Exploration of phase stability in the surfatron accelerator
[DE84-011416] N84-30260
Delayed effects of proton irradiation in Macaca mulatta. 3: Glucose intolerance
[AD-A142289] N84-30669
Biological effects of millimeter-wave irradiation: Living bacterial organisms
[AD-A142474] N84-30670
Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678
Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680
Preliminary result of our new Nationwide Evaluation of X-ray Trends (NEXT) program for Italy
[ISS-L-84/3] N84-30693
Impact of laser radiation on optical properties of polymer liquid crystal in phase transition range N84-30868

RADIATION MEASURING INSTRUMENTS
Instrumentation for nonionizing radiation measurement
[PB84-180603] N84-30271

RADIATION PRESSURE
Lageos orbit and the albedo problem N84-30464
Lageos orbit and solar eclipses N84-30465

RADIATION PROTECTION
Space nuclear safety program
[DE84-011015] N84-30943

RADIATION SHIELDING
Graphite-ceramic RF Faraday-thermal shield and plasma limiter
[DE84-010960] N84-30086

RADIATION TOLERANCE
Delayed effects of proton irradiation in Macaca mulatta. 3: Glucose intolerance
[AD-A142289] N84-30669

RADIATIVE TRANSFER
Evaluation of the radiometric integrity of LANDSAT-4 Thematic Mapper band 6 data N84-30375
Earth Observing System, introduction N84-30451
Accuracy of one approximate method for computing radiative fluxes in presence of broken clouds N84-30491
Small-angle method in study of single and multiple scattering N84-30492
The Earth's radiation belts
[AD-A142673] N84-30574

RADICALS
Investigation of laser induced radical reactions using time resolved infrared and coherent anti-Stokes Raman scattering (CARS) spectroscopy
[MPIS-17/1983] N84-30008
Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922

RADII
New algorithms for near neighbor searching
[AD-A142404] N84-30824

RADIO BURSTS
Solar-geophysical data comprehensive reports, February 1984, number 474. Part 2: Data for August 1983, April 1981 and miscellanea. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188671] N84-31077
RADIO COMMUNICATION
An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array
[AD-A142478] N84-30159
Evolution of structure in the PLACES barium clouds
[DE84-010996] N84-30583
RADIO FREQUENCIES
RF sputtering and annealing of amorphous zinc telluride films
[USIP-84-04] N84-30061
Inventory RF radiation levels in the Netherlands, part 1
[LEOK-TR-1984-02-PT-1] N84-30167
Instrumentation for nonionizing radiation measurement
[PB84-180603] N84-30271
RFQ radial matching sections and fringe fields
[DE84-011408] N84-30920
Theoretical studies of Elmo Bumpy Torus (EBT)
[DE84-010814] N84-30978
High-gradient, pulsed operation of superconducting niobium cavities
[DE84-012498] N84-31030
RADIO FREQUENCY HEATING
Finite-element-analysis of fields radiated from ICRF antenna
[IPPJ-675] N84-30965
RADIO FREQUENCY INTERFERENCE
Spectrum/orbit utilization program for geostationary satellites
[NASA-TM-83759] N84-30146
RADIO RECEPTION
An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array
[AD-A142478] N84-30159
RADIO TELEMETRY
Vertebrate behavior and ecology
[DE84-007318] N84-30673
RADIO TRANSMISSION
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
RADIO WAVES
Soliton collapse during ionospheric heating
[DE84-009994] N84-30576
Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010842] N84-30999
RADIOACTIVE DECAY
Hypernuclear research at the AGS
[DE84-010282] N84-30915
Calculation of molecular final states and their effect on a precision neutrino mass experiment
[DE84-011071] N84-30921
RADIOACTIVE WASTES
Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada
[DE84-009032] N84-30610
Role of trench caps in the shallow land burial of low level wastes
[DE84-011824] N84-30944
Ambient temperature testing of the G-tunnel heated block
[DE84-009927] N84-30945
A study of research needs and priorities in radioactive waste management
[DE84-009045] N84-30946
King's Trough Flank: Geological and geophysical investigations of its suitability for high-level radioactive waste disposal
[IOS-166] N84-30950
RADIOBIOLOGY
Guidelines for running the thermal computational model of the eye
[AD-A142550] N84-30668
RADIOMETRIC CORRECTION
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1
[E84-10166] N84-30359
Radiometric calibration and processing procedure for reflective bands on LANDSAT-4 protoflight Thematic Mapper N84-30366
Thematic Mapper Image Processing System (TIPS) processing status N84-30368
Thematic Mapper image production in the engineering checkout phase N84-30369
LANDSAT-4 radiometric and geometric correction and image enhancement results --- San Francisco Bay, California N84-30370
TM digital image products for applications
N84-30371
Thermal band characterization of LANDSAT-4 Thematic Mapper --- Buffalo, New York and water temperature in Lake Erie N84-30376
A preliminary assessment of LANDSAT-4 Thematic Mapper data N84-30377
Revised radiometric calibration technique for LANDSAT-4 Thematic Mapper data by the Canada Centre for Remote Sensing N84-30378
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30380
In-flight absolute radiometric calibration of the Thematic Mapper N84-30383
RADIOMETRIC RESOLUTION
Pre-launch absolute radiometric calibration of LANDSAT-4 protoflight Thematic Mapper N84-30373
Relative radiometric calibration of LANDSAT TM reflective bands — San Francisco, California
N84-30374
Evaluation of the radiometric integrity of LANDSAT-4 Thematic Mapper band 6 data N84-30375
A preliminary analysis of LANDSAT-4 Thematic Mapper radiometric performance N84-30379
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30380
Scan-angle and detector effects in Thematic Mapper radiometry N84-30386
Thematic Mapper spectral dimensionality and data structure N84-30387
MTF analysis of LANDSAT-4 Thematic Mapper
N84-30388
Intraband radiometric performance of the LANDSAT-4 Thematic Mapper N84-30389
Analysis of LANDSAT-4 TM data for lithologic and image mapping purpose N84-30390
The use of linear feature detection to investigate Thematic Mapper data performance and processing
N84-30393
Spatial resolution estimation of LANDSAT-4 TM data
N84-30394
Investigation of TM band-to-band registration using the JSC registration processor N84-30398
Radiometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) data — Vermont
N84-30401
Investigation of radiometric properties of LANDSAT-4 MSS N84-30403
Radiometric calibration and geocoded precision processing of LANDSAT-4 Multispectral Scanner products by the Canada Centre for Remote Sensing N84-30404
Impact of LANDSAT MSS sensor differences on change detection analysis N84-30408
Impact of Thematic Mapper sensor characteristics on classification accuracy N84-30410
Quick look analysis of TM data of the Washington, District of Columbia area N84-30418
Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424
The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30428
RADIOSONDES
Automated analysis of upper air soundings to specify precipitation type
[PB84-174333] N84-30617
Variability of the convection field pattern in South Florida and its relationship to the synoptic flow
[PB84-177393] N84-30623
RAIN
The evaluation of prediction models for microwave attenuation by rainfall
[PB84-182104] N84-30170
RAMAN SPECTRA
Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaammineosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands
[AD-A142418] N84-29987
Efficient forward conversion in a Raman generator
[DE84-007466] N84-30285
Study of stimulated Brillouin and Raman scattering
[DE84-011260] N84-30286
Observation of scattered light between Omega-2 and 3/2-Omega in short wavelength laser produced plasmas
[DE84-012533] N84-31001
A new model of Raman spectra in laser produced plasma
[DE84-012487] N84-31005
RAMAN SPECTROSCOPY
Surface-enhanced Raman spectroscopy of electrochemically characterized interfaces. Transition-metal isothiocyanate adsorbates at silver adsorbates
[AD-A142407] N84-29986
Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaammineosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands
[AD-A142418] N84-29987
RAMJET ENGINES
Firebolt derivative/ramjet engine feasibility investigation (core engine program): Program summary N84-29962
Aerodynamic and Propulsion Test Unit (APTU) performance with a vitiated air heater N84-29964
RAMJET MISSILES
Firebolt derivative/ramjet engine feasibility investigation (core engine program): Program summary N84-29962
RANDOM NOISE
Locally optimum and suboptimum detector performance in a non-Gaussian interference environment
[PB84-184738] N84-30173
On fixed-interval minimum symbol error probability detection
[AD-A142465] N84-30849
RANDOM VARIABLES
Applications of combinatorics to the busy period in several queueing models
[AD-A142492] N84-30850
RANGEFINDING
Range corrections for airborne radar - A joint STARS study
[AD-A142363] N84-30154
Panama Canal Fog Navigation Study: Candidate system definition
[PB84-180793] N84-30624
RANKINE CYCLE
Determination of thermal-degradation rates of some candidate Rankine-cycle organic working fluids for conversion of industrial waste heat into power
[DE84-009585] N84-30304
Engineering research on positive displacement gas expanders, phase 1
[DE84-008977] N84-30310
RARE EARTH ALLOYS
Formation of dispersions of rare earth oxides in titanium alloys using rapid solidification processing
[DE84-008664] N84-30048
RARE EARTH COMPOUNDS
Thin film synthesis of superconducting chemical compounds
[AD-A142541] N84-29992
RARE GAS-HALIDE LASERS
Visualization for a free jet by a laser induced fluorescence method and its structure N84-30120
RARE GASES
Measurements of integral state-specific cross sections of inelastic collisions between NO and noble gases
[MPIS-16/1983] N84-30935
RATS
Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657
RAYLEIGH SCATTERING
On molecular scattering in the terrestrial atmosphere: An empirical formula for its calculation in the homosphere
[AERONOMICA-ACTA-A-284-1984] N84-30564
REACTION KINETICS
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985
The reliability of standard rate constants for rapid electrochemical reactions
[AD-A142445] N84-29989
Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions
[AD-A142483] N84-29990
Modeling chemical kinetic aspects of engine knock
[DE84-009874] N84-30312
Plasma in diverter during intense recycling
N84-30877

REACTOR DESIGN
Thermal laminarization of a stratified pipe flow
[DE84-006407] N84-30236
Modeling the interaction of high power ion or electron beams with solid target materials
[DE84-009126] N84-30931
Liquid metal breeder-coolant blanket concept
[DE84-006554] N84-30971
REACTOR MATERIALS
Transmutation of manganese: Substituted steels in STARFIRE
[DE84-010402] N84-30035
Method of enhancing selective isotope desorption from metals
[DE84-011031] N84-30044
Heat pipe technology issues
[DE84-011384] N84-30248
Flow Induced Vibration Program at Argonne National Laboratory
[DE84-008233] N84-30249
Qualifications of ultrasonic testing for nuclear inservice inspection applications
[DE84-011899] N84-30323
Some scoping experiments for a space reactor
[DE84-009101] N84-30941
REACTOR TECHNOLOGY
Thermal laminarization of a stratified pipe flow
[DE84-006407] N84-30236
IEEE Transactions on Nuclear Science. Volume NS-30, no. 4, part 2: 1983 Particle Accelerator Conference
[DE84-007400] N84-30914
Magnetic fusion energy plasma interactive and high heat flux components. Volume 1: Technical assessment of the critical issues and problem areas in the plasma materials interaction field
[DE84-011527] N84-30969
Plasma Fusion Center technical research programs
[DE84-007954] N84-30983
REACTORS
Invention of a tunable damper for use with an acoustic waveguide in hostile environments
[DE84-013109] N84-30897
REAL TIME OPERATION
A data acquisition and real-time display system for testing a jet engine compressor
[AD-A142696] N84-30301
PRISM: A practical real-time imaging stereo matcher
[AD-A142532] N84-30686
An Ada (trademark) network: A real-time distributed computer system
[AD-P003423] N84-30755
Ada (trademark) for business and other non-DOD applications
[AD-P003425] N84-30757
Military Computer Family Operating System: An Ada (trademark) application
[AD-P003427] N84-30759
Selection of a general purpose language and a real-time language suitable for shipboard data system 3
[PB84-180892] N84-30795
Characterization of real-time computers
[NASA-CR-3807] N84-30801
Automated planning for intelligent machines in energy-related applications
[DE84-011666] N84-30815
Nonlinear real-time optical signal processing
[AD-A142619] N84-30956
RECOGNITION
Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation
[AD-A142554] N84-30160
Smoothed local symmetries and their implementation
[AD-A142489] N84-30811
RECONSTRUCTION
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
RECRYSTALLIZATION
Experimental studies of laterally seeded recrystallized polysilicon on silicon dioxide
[AD-A142382] N84-30077
RECURSIVE FUNCTIONS
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
Modifications to iterative recursion unfolding algorithms and computer codes to find more appropriate neutron spectra
[AD-A142475] N84-30775
Input-output parametric models for nonlinear systems. Part 1: Deterministic nonlinear systems
[RR-251-PT-1] N84-30844
REDUCTION (CHEMISTRY)
The role of sintering in the oxidation-reduction of palladium powders
[DE84-011202] N84-30059
Investigation of the role of sintering in gas-solid interactions
[DE84-010862] N84-30089
REDUNDANCY
Design philosophy for reliable systems, including control
[DE84-012681] N84-30814
REEFS
Geotechnical and geologic design considerations for a shelf mounted OTEC (Ocean Thermal Energy Conversion) facility
[PB84-186147] N84-30554
REENTRY VEHICLES
Dust particles in high speed flows: Calculations of small particle reentry hydrodynamics
[DE84-010998] N84-30245
REFINING
Method and apparatus for producing high purity silicon
[DE84-011087] N84-30090
REFLECTANCE
Snow reflectance from LANDSAT-4 Thematic Mapper
N84-30426
REFLECTOMETERS
Microspectrophotometer for crystal analysis by absorption reflectometry N84-30883
REFLECTORS
Support structures for large infrared telescopes
[NASA-CR-3800] N84-30328
REFRACTORY MATERIALS
Synthesis of refractory materials
[DE84-011045] N84-30041
Magnesia refractories produced from chemically modified periclase grains and Mg(OH)2 slurries
[PB84-178979] N84-30099
REFRIGERATING MACHINERY
Research and development of energy-efficient high back-pressure compressor
[DE84-011827] N84-30131
REFRIGERATORS
He-3 cooling systems for space
[NASA-TM-85985] N84-30226
REGENERATIVE COOLING
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
REGENERATIVE FUEL CELLS
An integrated space station propulsion system
N84-29933
REGIONAL PLANNING
Raster processing for regional planning tasks
N84-30507
REGRESSION ANALYSIS
Studies of statistical techniques to evaluate weather modification. Volume 1: Reports of OSET
[PB84-182906] N84-30620
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30692
REGULATIONS
Wetlands: Their use and regulation
[PB84-175918] N84-30561
Land Remote-Sensing Commercialization Act of 1984
[H-REPT-98-647] N84-31063
REINFORCEMENT (STRUCTURES)
Tensile crack exposure tests. Statistical analysis of the long-term durability of series B beams
[AD-A141955] N84-30335
Effects of bond deterioration on hysteretic behavior of reinforced concrete joints
[PB84-192020] N84-30343
Local bond stress-slip relationships of deformed bars under generalized excitations: Experimental recults and analytical model
[PB84-192848] N84-30355
RELATIVISTIC EFFECTS
New approach to polarized proton scattering based on Dirac dynamics
[DE84-008018] N84-30926
The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas
[IPPJ-676] N84-30964
RELATIVISTIC PLASMAS
The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas
[IPPJ-676] N84-30964
Lyapunov stability conditions for a relativistic multifluid plasma
[DE84-010004] N84-30973
Microstability theory for distributions separable in energy and pitch angle
[DE84-009683] N84-30991
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas
[DE84-012396] N84-31002
RELATIVISTIC THEORY
Spinorial relativistic rotator: The transformation from quasi-Newtonian to Minokowski coordinates
[DE84-009091] N84-30639
RELAXATION (MECHANICS)
Freejets of rotationally relaxing diatomic gases
N84-30119
RELAXATION METHOD (MATHEMATICS)
Optimization of a numerical method to calculate elliptic flows
[DFVLR-FB-84-16] N84-30252
RELIABILITY
AN/APN-128 Lightweight Doppler Navigation System (LDNS) case study report (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142072] N84-29860
F-15 AN/APG-63 radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142071] N84-29873
F-16 APG-66 fire control radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142075] N84-29874
A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919
Purification of nitrogen tetroxide for long-term reliability
N84-29920
Flaw detection reliability criteria. Volume 1: Methods and results
[AD-A142001] N84-30320
R and M (Reliability and Maintainability) program review elements document (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142073] N84-30322
Improving system affordability
[AD-A142387] N84-31062
RELIABILITY ANALYSIS
Field repair of AH-16 helicopter window cutting assemblies
[NASA-TM-85831] N84-29864
Human reliability analysis using event trees
[S/T-REPT-VOL-1-NO-3] N84-30718
Software quality assurance programs: Key elements of concern in selected commercial approaches
[DE84-009486] N84-30785
Design philosophy for reliable systems, including control
[DE84-012681] N84-30814
RELIABILITY ENGINEERING
A summary of fault tolerant computing research at Carnegie Mellon University
[AD-A142707] N84-30777
RELUCTANCE
Prediction and analysis of variable reluctance stepmotor drive systems
[NLR-TR-81139-U] N84-30216
REMOTE CONTROL
Advanced teleoperation in nuclear applications: Consolidated fuel reprocessing program
[DE84-011631] N84-30303
Robotic deburring. Part 1: Preliminary observations
[DE84-010768] N84-30305
REMOTE HANDLING
Advanced teleoperation in nuclear applications: Consolidated fuel reprocessing program
[DE84-011631] N84-30303
Advancement of remote systems technology: Past perspectives and future plans
[DE84-011460] N84-30309
REMOTE SENSING
Thematic Mapper sensor characteristics N84-30365
Calibration of TM data from ground-based measurements N84-30385
Scan-angle and detector effects in Thematic Mapper radiometry N84-30386
Global hydrologic cycle N84-30434
Global biogeochemistry: An overview N84-30435
Biogeochemical considerations N84-30436
Biological oceanography N84-30437
Inland aquatic resources and biogeochemical cycles
N84-30438
Forest environments N84-30439
Land biology N84-30440
Tropospheric chemistry N84-30441
Geology N84-30442
Earth Observing System. Science and mission requirements, volume 1, part 1
[NASA-TM-86129-VOL-1-PT-1] N84-30450

Earth Observing System, introduction N84-30451
Observational requirements and measurement systems concepts N84-30452
Implementation strategy N84-30453
Earth Observing System, conclusions and recommendations N84-30454
Geodyn systems development N84-30467
Ocean circulation studies N84-30469
Global mean sea surface based upon SEASAT altimeter data N84-30470
SEASAT altimetry for surface height of inland seas N84-30472
Accuracy of mapping the Earth's gravity field fine structure with a spaceborne gravity gradiometer mission N84-30473
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512
A description of the MIZEX 1984 remote sensing activities
[AD-A142296] N84-30514
Remote sensing and the private sector: Issues for discussion
[PB84-160777] N84-30520
Land Remote-Sensing Commercialization Act of 1984
[H-REPT-98-647] N84-31063

REMOTE SENSORS
A description of the MIZEX 1984 remote sensing activities
[AD-A142296] N84-30514
Undersea acoustic research
[AD-A142339] N84-30891

REMOTELY PILOTED VEHICLES
Simulator evaluation of a remotely piloted vehicle lateral landing task using a visual display
[NASA-TM-85903] N84-29885

REMOVAL
Bias removal for conventional magnetotelluric data
[DE84-012189] N84-30579

REPORTS
National Center for Atmospheric Research
[PB84-183581] N84-30621
Research activities. Part 1: Statements
[ISBN-3-7983-0959-0] N84-31082

REQUIREMENTS
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures
[AD-A142424] N84-29866
Implementation strategy N84-30453

RESEARCH
Institutional supporting research highlights in physics and mathematics, fiscal year 1983
[DE84-011025] N84-30855
Undersea acoustic research
[AD-A142339] N84-30891
Research activities. Part 1: Statements
[ISBN-3-7983-0959-0] N84-31082

RESEARCH AIRCRAFT
Theoretical and measured airflow about the Twin Otter wing
[AD-A141974] N84-29855

RESEARCH AND DEVELOPMENT
Some aerodynamic discoveries and related NACA/NASA research programs following World War 2
[NASA-TM-86258] N84-29847
Electronics Division research and development
[DE84-011024] N84-30200
Photovoltaics: Electricity from Sunlight, five-year research plan, 1984-1988
[DE84-010679] N84-30544
National Center for Atmospheric Research
[PB84-183581] N84-30621
Review of the Third Biennial Conference on Real-Time Computer Applications in Nuclear and Particle Physics
[DE84-002457] N84-30720
Guide to graphics at ANL, revised
[DE84-013189] N84-30786
New directions in linear accelerators
[DE84-011412] N84-30911
Appropriate Technology Small Grants Program evaluation, volume 1: Executive summary
[DE84-010675] N84-31038
Appropriate Technology Small Grants Program evaluation, volume 2
[DE84-010674] N84-31039
Science and technology report to the Congress, 1982
[DE84-901150] N84-31040
Federal funds for research and development. fiscal years 1981, 1982 and 1983, volume 31
[PB84-189596] N84-31045
Federal funds for research and development, fiscal years 1982, 1983 and 1984. Volume 32: Detailed statistical tables
[PB84-189604] N84-31046

RESEARCH FACILITIES
Experimental facilities to study hydrogen combustion and detonation
[DE84-008996] N84-29997
Scientific-Technical Facilities Department. Scientific-technical report
[ESA-TT-843] N84-31083

RESEARCH MANAGEMENT
Salyut: Soviet steps toward permanent human presence in space
[PB84-181437] N84-29905
Dynamic powder compaction
[DE84-006133] N84-30132
Photovoltaics: Electricity from Sunlight, five-year research plan, 1984-1988
[DE84-010679] N84-30544
A study of research needs and priorities in radioactive waste management
[DE84-009045] N84-30946
Appropriate Technology Small Grants Program evaluation, volume 2
[DE84-010674] N84-31039
Science and technology report to the Congress, 1982
[DE84-901150] N84-31040
National Science Foundation, volume 1
[PB84-193234] N84-31061
Scientific-Technical Facilities Department. Scientific-technical report
[ESA-TT-843] N84-31083

RESERVOIRS
Using chemically reactive tracers to determine temperature characteristics of geothermal reservoirs
[DE84-011373] N84-30580

RESIDUAL STRESS
Residual curing stress of carbon-resin composites
[ONERA-RT-6/3521-M] N84-29960
Residual stress measurements using shear-horizontal waves from electromagnetic acoustic transducers
[PB84-190636] N84-30171

RESIN MATRIX COMPOSITES
Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972
Synthesis and toughness properties of resins and composites N84-29973

RESINS
Synthesis and toughness properties of resins and composites N84-29973

RESISTANCE
Upset weld study for joining 304L stainless steel tubes
[DE84-011507] N84-30313
The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings
[MRL-R-924] N84-30332
Energy-resolving carbon resistance probes for plasma edge characterization
[DE84-012235] N84-30997

RESONANCE
Reactive resonance and angular distributions in the rotating linear model
[DE84-011354] N84-30919

RESONANCE FLUORESCENCE
Evolution of structure in the PLACES barium clouds
[DE84-010996] N84-30583

RESONANT FREQUENCIES
The temperature sensitivity of doubly rotated quartz resonators
[AD-A142537] N84-30186

RESONANT VIBRATION
Resonance in the water circuit of a cooling tower
[S/T-REPT-VOL-1-NO-2] N84-30254

RESONATORS
The temperature sensitivity of doubly rotated quartz resonators
[AD-A142537] N84-30186
High-Q open resonator structures with sparse spectrum N84-30676

RESOURCE ALLOCATION
Federal Aviation Administration's system for prioritizing airport grants
[PB84-181650] N84-29893

RESOURCES MANAGEMENT
US average wind power by season
[DE84-012214] N84-30613

RESPIRATION
The toxicity of petroleum and shale JP5
[AD-A142670] N84-30690

RESPIRATORY PHYSIOLOGY
Exchange of gases and physical work capacity in natives of different geographic regions N84-30656

RESPIRATORY RATE
Circadian pattern of simian functional parameters during hypokinesia and in the recovery period N84-30650

RETENTION (PSYCHOLOGY)
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677
The representation of part-whole information in memory
[PB84-180140] N84-30701

RETIREMENT
Cost/risk analysis for disk retirement, volume 1
[AD-A141978] N84-29861

RETRAINING
A model of the shoulder girdle for use in rehabilitation N84-30710

REVERSE FIELD PINCH
Internal magnetic field measurements in a translating field-reversed configuration
[DE84-010054] N84-30854
Steady state compact toroidal plasma production
[DE84-011090] N84-30977

REYNOLDS NUMBER
Kolmogorov-style argument for the decaying homogeneous MHD turbulence
[IPPJ-677] N84-30963

RHEOLOGY
Reliability and efficiency of Kubicek rheographic method for monitoring cardiac output and stroke volume N84-30644

RHODE ISLAND
Water resources data for Massachusetts and Rhode Island, water year 1982
[PB84-180009] N84-30521

RIBONUCLEIC ACIDS
Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677

RICCATI EQUATION
Stabilization studies
[AD-A142644] N84-30832

RING LASERS
Reflex ring laser amplifier system
[DE84-010874] N84-30282

RING STRUCTURES
Galvanic corrosion of an aluminum O-ring
[DE84-011345] N84-30047
Ring-type support concept for twisted coils (finite element simulation) — stellarators
[IPP-2/271] N84-30327

RISK
Guidelines for contingency planning NASA (National Aeronautics and Space Administration) ADP security risk reduction decision studies
[PB84-189836] N84-30737

RIVER BASINS
Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications N84-30431
Delineation of wetland boundaries using vegetation within the Altamaha River Basin of Georgia
[AD-A142590] N84-30515
Estimation of recharge in a small southern Arizona basin by means of hydrological, hydrochemical, and environmental isotope data
[PB84-159672] N84-30527

ROADS
Research and development of long heat pipes and their applications — heating road surfaces on bridges N84-30126

ROBOTICS
Precision flexible machining cells within a manufacturing system
[AD-A142527] N84-30129
Initial insights on robotics
[DE84-010768] N84-30302
Robotic deburring. Part 1: Preliminary observations
[DE84-010766] N84-30305
PRISM: A practical real-time imaging stereo matcher
[AD-A142532] N84-30686
Artificial intelligence and robotics
[AD-A142488] N84-30810

ROBOTS
Strategies for analytical applications and implementation of a multi-purpose laboratory robot
[DE84-012379] N84-30314
Artificial intelligence and robotics
[AD-A142488] N84-30810

ROCK INTRUSIONS
Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results — Death Valley, California, Cement-Velma, Oklahoma; Big Horn and Wind River Basins, Wyoming; Spanish Peaks, Colorado; and the Four Corners area (Paradox Basin of Utah and Colorado) N84-30412

ROCK MECHANICS
Computational method for thermoviscoelasticity with application to rock mechanics [DE84-003087] N84-30585
Ambient temperature testing of the G-tunnel heated block [DE84-009927] N84-30945

ROCKET ENGINE CASES
Development and fabrication of a graphite/epoxy motor case for air launch missile applications N84-29948
Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954

ROCKET ENGINE DESIGN
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
The liquid bipropellant stage concept: Filling the OTV gap N84-29936
AFRPL solar-thermal rocket activities N84-29938

ROCKET ENGINES
Low thrust bipropellant engine development N84-29912
Propulsion options for orbit-on-demand N84-29915
Evolution and flight history of the Defense Meteorological Satellite Program (DMSP) propulsion module N84-29917
MPD thruster comparisons with advanced chemical systems for auxiliary propulsion applications N84-29928
Thrust balance efficiency measurements for a pulsed inductive thruster N84-29930
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
The liquid bipropellant stage concept: Filling the OTV gap N84-29936
AFRPL solar-thermal rocket activities N84-29938
History of aircraft escape system propulsion N84-29941
Propulsion in a life-saving role for ACES 2 N84-29942
The Stencel S4S ejection seat: A study in new pyrotechnic developments N84-29943
Crest: Crew escape technologies for the 1990's N84-29944
Characterization of filament wound Kevlar and glass composites for rocket motor applications N84-29949
A turbomechanical thrust vector control for advanced intercontinental ballistic missiles N84-29953
An MPD thruster with liquid metal injection [ISAS-610] N84-30103

ROCKET LAUNCHING
Geokinetic effects on motion sensitive instrumentation, systems and facilities [AD-A142682] N84-30575

ROCKET NOZZLES
Fluidic thrust vector control thruster development N84-29940

ROCKET OXIDIZERS
A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919

ROCKET PROPELLANTS
An MPD thruster with liquid metal injection [ISAS-610] N84-30103

ROCKS
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416
Computational method for thermoviscoelasticity with application to rock mechanics [DE84-003087] N84-30585

ROCKWELL HARDNESS
Hard metal composition [DE84-011034] N84-30040

RODS
Analysis of fracture modes during extrusion and drawing of bimetal rods or wire [DE84-009649] N84-30051

ROLLING CONTACT LOADS
Friction in low speed lubricated rolling and sliding contacts [VTT-16] N84-30318

ROOMS
Natural convection flows and associated heat transfer processes in room fires [PB84-171172] N84-30140

ROTARY WINGS
The influence of a wind tunnel on helicopter rotational noise: Formulation of analysis [NASA-TM-85962] N84-30687

ROTATING BODIES
An experimental study of helical guide-type rotating heat pipe N84-30123

ROTATING LIQUIDS
Invariance of level of rotating liquid [BLL-M-35611-(5828.4)] N84-30220

ROTATING SHAFTS
Dual rotating shaft seal apparatus [DE84-011101] N84-30307

ROTATION
Seismic response for multicomponent earthquakes [PB84-193747] N84-30354
Singular value decomposition with systolic arrays [NASA-CR-172396] N84-30617
Rotation and impurity transport in a Tokamak plasma with directed neutral beam injection [DE84-008014] N84-30996

ROTOR AERODYNAMICS
Aeroelasticity in turbomachine-cascades [AD-A141905] N84-29880
Two-dimensional and quasi three-dimensional experimental standard configurations for aeroelastic investigations in turbomachine-cascades [AD-A141904] N84-30297

ROTOR BLADES (TURBOMACHINERY)
Aeroelasticity in turbomachine-cascades [AD-A141905] N84-29880
Acoustic pressures emanating from a turbomachine stage [NASA-TM-83734] N84-30224
Two-dimensional and quasi three-dimensional experimental standard configurations for aeroelastic investigations in turbomachine-cascades [AD-A141904] N84-30297
Improved methods of vibration analysis of pretwisted, airfoil blades [NASA-TM-83735] N84-30329

ROUGHNESS
Mechanical interactions of rough surfaces [DE84-008589] N84-30311

RUNGE-KUTTA METHOD
Acceleration to a steady state for the Euler equations [NASA-CR-172398] N84-29852

RURAL AREAS
On-site analysis to assess the feasibility of wind power [DE84-009762] N84-30606

RYDBERG SERIES
Photoelectron studies of excited molecular states: H2 C (1)PI(sub u) and N2 o3 (1)PI(sub u) [DE84-006663] N84-30917
Photoionization of excited molecular states using multiphoton excitation techniques [DE84-004034] N84-30925

S

S WAVES
Residual stress measurements using shear-horizontal waves from electromagnetic acoustic transducers [PB84-190636] N84-30171
Experimental observation of the shear Alfven resonance in a Tokamak [DE84-012993] N84-30998

SACCHAROMYCES
Nutritional and environmental factors in ethanol fermentation by Saccharomyces cerevisiae [DE84-009693] N84-30110

SAFETY
Design of a safety monitor system for high explosives machining [DE84-010101] N84-30113

SAFETY FACTORS
The changing airline industry: A status report through 1982 [GAO/RCED-83-179] N84-29858

SALINITY
Long-term salinity, temperature and current measurements in upper Chesapeake Bay [PB84-180280] N84-30636
Salinity and temperature effects on photosynthesis and organic carbon release rates by selected benthic macroalgae [PB84-163146] N84-30674

SALMONELLA
Biological effects of millimeter-wave irradiation: Living bacterial organisms [AD-A142474] N84-30670

SALT SPRAY TESTS
Cadmium plating versus other coatings to prevent corrosion [AD-A142504] N84-30022

SALTON SEA (CA)
An analysis LANDSAT-4 Thematic Mapper geometric properties N84-30392
Proposed scientific activities for the Salton Sea scientific drilling project [DE84-012256] N84-30586

SALYUT SPACE STATION
Salyut: Soviet steps toward permanent human presence in space [PB84-181437] N84-29905

SAMPLING
Vapor spill pipe monitor [DE84-011103] N84-30267
Sampling report for the study of personal CO (carbon monoxide) exposure [PB84-181957] N84-30660

SAN ANDREAS FAULT EXPERIMENT
Update: San Andreas Fault experiment N84-30456

SAN FRANCISCO (CA)
Debris Flows, Landslides, and Floods in the San Francisco Bay Region, January 1982: Overview and summary of a conference [PB84-194737] N84-30590

SANDWICH STRUCTURES
Ceramic to metal attachment system — magnetohydrodynamic generators [DE84-011095] N84-30065

SATELLITE IMAGERY
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1 [E84-10166] N84-30359
Geodetic accuracy of LANDSAT-4 Multispectral Scanner and Thematic Mapper data N84-30399
LANDSAT scene-to-scene registration accuracy assessment N84-30405
Geometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) — Washington, D.C. N84-30407
Inland aquatic resources and biogeochemical cycles N84-30436
Tropospheric chemistry N84-30441
Geology N84-30442
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images [AD-A142019] N84-30512

SATELLITE OBSERVATION
Ocean circulation studies N84-30469
Global mean sea surface based upon SEASAT altimeter data N84-30470
SEASAT altimetry for surface height of inland seas N84-30472
Derivation of crustal magnetic anomalies from MAGSAT [REPT-609] N84-30569

SATELLITE ORBITS
Lageos orbit and solar eclipses N84-30485
Verification of the accuracy of GEM-L2 in response to criticism by Lambeck and Coleman N84-30486
The ERODYN and QRPIG computer programs N84-30488
Proton-induced single event upsets in the SBP9989 microprocessor [AD-A142448] N84-30724

SATELLITE ROTATION
Low thrust bipropellant engine development N84-29912

SATELLITE-BORNE INSTRUMENTS
Spectral characterization of the LANDSAT Thematic Mapper sensors N84-30372
Pre-launch absolute radiometric calibration of LANDSAT-4 protoflight Thematic Mapper N84-30373
SEASAT altimetry for surface height of inland seas N84-30472
Recommended program activities, 1988-1998 N84-30478
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder [NOAA-TM-NESDIS-6] N84-30571

SAWS
Electric arc saw apparatus [DE84-006153] N84-30308

SCALE (RATIO)
An example of computer aided generalization of TK 25 — topographical map 1:25,000 (TK 25) N84-30504

SCANNERS
A system for automatic digitization of cartographic line drawings N84-30506

SCAPULA
A model of the shoulder girdle for use in rehabilitation N84-30710

SCATTERING
Reactive resonance and angular distributions in the rotating linear model [DE84-011354] N84-30919
Scattering experiments on rotational excitation of methane in collision with noble gases [MPIS-3/1984] N84-30936

SCATTERING COEFFICIENTS
Nordsee radar backscatter measurements data report [AD-A141914] N84-30148

SCATTERING CROSS SECTIONS
Measurements of integral state-specific cross sections of inelastic collisions between NO and noble gases [MPIS-18/1983] N84-30935

SCENE ANALYSIS
Intraband radiometric performance of the LANDSAT-4 Thematic Mapper N84-30389
Spatial resolution estimation of LANDSAT-4 TM data N84-30394

SCHEDULING
A problem expending parametric programming method for solving the job shop scheduling problem
[AD-A142392] N84-31036

SCIENCE
Guidelines for the design of large modular scientific libraries in Ada
[CWI-NM-N8401] N84-30792

SCINTILLATION
Evaluation of the attenuation length of a scintillator by means of a computer simulation of the light collection efficiency in long scintillation counters
[NOTA-INTERNA-820] N84-30169

SCINTILLATION COUNTERS
Evaluation of the attenuation length of a scintillator by means of a computer simulation of the light collection efficiency in long scintillation counters
[NOTA-INTERNA-820] N84-30169
Drift scintillation meter
[AD-A142523] N84-30966

SCREW DISLOCATIONS
Nonlocal continuum theory for dislocation and fracture
[AD-A142536] N84-30340

SCREWS
Cadmium plating versus other coatings to prevent corrosion
[AD-A142504] N84-30022
Helical screw viscometer
[DE84-011111] N84-30261

SEA ICE
Earth Observing System. Volume 1, part 2: Science and mission requirements. Working group report appendix
[NASA-TM-86129] N84-30433
Polar glaciology N84-30445
Sea ice N84-30446
Meteorological research and support for the MIZEX (Marginal Ice Zone Experiment) program
[AD-A142409] N84-30596

SEALS (STOPPERS)
Quality control analysis of TA-23 glass seals for lithium ambient temperature batteries
[DE84-011710] N84-30094
Dual rotating shaft seal apparatus
[DE84-011101] N84-30307

SEARCH RADAR
Evaluation of U.S. Coast Guard forward-looking airborne radars
[AD-A142417] N84-30156

SEARCHING
Evaluation of U.S. Coast Guard forward-looking airborne radars
[AD-A142417] N84-30156
Verification of asynchronous transmissions
[PB84-189865] N84-30736
New algorithms for near neighbor searching
[AD-A142404] N84-30624

SEASAT SATELLITES
SEASAT observations of lithospheric flexure N84-30463

SEATS
Decision analysis model for passenger-aircraft fire safety with application to fire-blocking of seats
[AD-A142477] N84-29859
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868

SECURITY
Cosmic bombardment
[DE84-011402] N84-31071

SEDIMENT TRANSPORT
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 2: Mid-Atlantic region
[PB84-187947] N84-30640

SEDIMENTS
A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 2: Mid-Atlantic region
[PB84-187947] N84-30640
Geographic distribution of wetland parameters: The foundation of a data base N84-30667

SEISMIC ENERGY
Seismicity of the Paradox Basin and the Colorado Plateau interior
[DE84-011620] N84-30516
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30606

SEISMIC WAVES
System identification of structures with joint rotation
[PB84-192210] N84-30357
Common data base experiment: Detection and location capacity
[FOA-C-20538-T1] N84-31058

SEISMOGRAPHS
Seismic response for multicomponent earthquakes
[PB84-193747] N84-30354

SEISMOLOGY
Research activities of the Geodynamics Branch
[NASA-TM-86123] N84-30455
Crustal deformation and earthquakes N84-30457
Geodynamics of crustal deformation and seismotectonic block movements in central Europe N84-30460
Dependence of crustal structure of eastern Pacific Ocean on its age N84-30483
Structure of ocean floor in relation to conditions for formation of lithosphere N84-30484
Developments of research on prediction of earthquakes, tsunami and volcanic eruptions in Far East N84-30485
Seismicity of the Paradox Basin and the Colorado Plateau interior
[DE84-011620] N84-30516
Geokinetic effects on motion sensitive instrumentation, systems and facilities
[AD-A142682] N84-30575
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30608

SELECTION
Sampling report for the study of personal CO (carbon monoxide) exposure
[PB84-181957] N84-30560

SELECTIVE FADING
Performance of digital communications over selective fading channels
[AD-A142427] N84-30158

SELECTIVITY
Method of enhancing selective isotope desorption from metals
[DE84-011031] N84-30044

SELENIUM
Holographic interferometry using 20-picosecond UV pulses to obtain time resolved hydro measurements of selenium and gold plasmas
[DE84-009485] N84-30269

SELENIUM COMPOUNDS
Impact of weak electric field on photoconductivity of modified vitreous As2Se3 N84-30667
Electron-microscopic microstructural examination of glassy Ge-Se semiconductors N84-30671

SEMANTICS
Syntax and semantics of a LINCS control monologue
[DE84-011399] N84-30605

SEMICONDUCTING FILMS
Chemical vapor deposition of amorphous semiconductor films
[DE84-004489] N84-31026

SEMICONDUCTOR DEVICES
Measurement techniques for high-power semiconductor materials and devices
[DE84-010425] N84-31016

SEMICONDUCTORS (MATERIALS)
The 8th European Specialist Workshop on Active Microwave Semiconductor Devices 4-6 may 1983
[AD-A142252] N84-30180
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30662
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer N84-30665
New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30666
Electron-microscopic microstructural examination of glassy Ge-Se semiconductors N84-30671
Diffusion and electrical properties of sulfur implanted in gallium arsenide
[AD-A142405] N84-31012

SEMISPAN MODELS
Half-model testing in the NLR high speed wind tunnel (HST)
[NLR-TR-82123-U] N84-29691

SENSITIVITY
Application of sensitivity analysis to aerodynamic parameters of a bank to turn missile
[AD-A141940] N84-29699
Sensitivity of SLR baselines to errors in Earth orientation N84-30461
Geokinetic effects on motion sensitive instrumentation, systems and facilities
[AD-A142682] N84-30575

SENSITIZING
The influence of nitrogen on the sensitization, corrosion, mechanical and microstructural properties of stainless steels
[DE83-017203] N84-30050

SENSORS
Comparison of lightning flash rates from the PBE sensor and streak counting from the DMSP satellite
[DE84-006722] N84-30602

SEPAC (PAYLOAD)
A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30588

SEPARATED FLOW
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1984-1, 218/ January - February
[ESA-TT-858] N84-29650

SEPARATORS
Development of hydrocyclones for aluminum/air battery applications
[DE84-011403] N84-30197

SEQUENCING
The complexity of sorting on distributed systems
[AD-A142415] N84-30625

SERVICE LIFE
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures
[AD-A142424] N84-29666
Experimental study of the naphtaline heat pipe N84-30125
Testing, data analysis and engineering services on lead-acid load leveling batteries
[DE84-011523] N84-30196
Effects of variations in coldworking repair procedures on flaw growth and structural life
[AD-A141966] N84-30336
Measurement techniques for high-power semiconductor materials and devices
[DE84-010425] N84-31016

SERVOCONTROL
Dual arm master controller concept: Consolidated fuel reprocessing program
[NASA-CR-173843] N84-30296

SERVOMECHANISMS
Dual arm master controller concept: Consolidated fuel reprocessing program
[NASA-CR-173843] N84-30296
Advanced teleoperation in nuclear applications: Consolidated fuel reprocessing program
[DE84-011631] N84-30303
Advancement of remote systems technology: Past perspectives and future plans
[DE84-011460] N84-30309

SET THEORY
Boolean computation of optimum hitting sets
[DE84-012920] N84-30642

SEYFERT GALAXIES
Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

SHALES
The toxicity of petroleum and shale JP5
[AD-A142670] N84-30690

SHALLOW WATER
Wind-generated noise in shallow water
[AD-A141981] N84-30690

SHAPES
The occultation of AG+29 deg 398 by 93 Minerva
[NASA-CR-173827] N84-31066

SHEAR FLOW
Prediction of the temperature characteristics in intermittent, free turbulent shear layers
[CFD/84/1] N84-30256
Inertial and shear flow N84-30674

SHEAR LAYERS
Numerical analysis of the burst in the turbulent boundary layer, based on the three-dimensional ortex model N84-30116

SHEAR PROPERTIES
Synthesis and toughness properties of resins and composites N84-29973
Method and apparatus for measuring stress
[DE84-011035] N84-30347

SHEAR STRESS
Postbuckling behavior of graphite-epoxy panels N84-29[illegible]76

SHIPS
US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141810] N84-30627

SHOCK ABSORBERS
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868
Shock wave absorber having a deformable liner
[DE84-011308] N84-30243
Shock wave absorber having apertured plate
[DE84-011271] N84-30345
SHOCK TESTS
NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures
[AD-A142290] N84-30337
SHOCK TUBES
NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures
[AD-A142290] N84-30337
SHOCK WAVE PROPAGATION
Energy release and fluid dynamics in multiphase systems
[AD-A142402] N84-30228
Numerical simulations of the structure and propagation of self-sustained detonations
[AD-A142486] N84-30230
SHOCK WAVES
Mechanical properties of a shock consolidated steel powder
[DE84-003573] N84-30056
Energy release and fluid dynamics in multiphase systems
[AD-A142402] N84-30228
Shock wave absorber having a deformable liner
[DE84-011308] N84-30243
Development of a high-pressure quasi-isentropic plane wave generating capability
[DE84-011619] N84-30348
Investigation of laminar shocks
[DE84-010074] N84-30582
Spectral methods for compressible flow problems
[NASA-CR-172395] N84-30816
Some contributions to knowledge of the magnetospheric plasma by ISEE investigators
[NASA-TM-86124] N84-30962
Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30980
SHOPS
A problem expanding parametric programming method for solving the job shop scheduling problem
[AD-A142392] N84-31036
SHOULDERS
A model of the shoulder girdle for use in rehabilitation
N84-30710
Treatment of patients with a lesion of the brachial plexus N84-30712
SHUTDOWNS
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29879
SIDEBANDS
Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884
SIGNAL ANALYSIS
Large-signal characterization of nonlinear two-port active networks
[AD-A142462] N84-30184
On fixed-interval minimum symbol error probability detection
[AD-A142465] N84-30849
SIGNAL DETECTION
List metric detection of coded FH/MFSK (Frequency-Hopped Multiple Frequency Shift Keying) in a tone jamming environment
[AD-A142358] N84-30153
Locally optimum and suboptimum detector performance in a non-Gaussian interference environment
[PB84-184738] N84-30173
High resolution, high rate X-ray spectrometer
[DE84-011116] N84-30266
Use of Peltier effect for small signal amplification and conversion N84-30864
SIGNAL ENCODING
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
SIGNAL PROCESSING
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
Locally optimum and suboptimum detector performance in a non-Gaussian interference environment
[PB84-184738] N84-30173
Research in VLSI (Very Large Scale Integration) systems
[AD-A142511] N84-30185
New adaptive processor for coherent signals and interference
[AD-A142638] N84-30776
On fixed-interval minimum symbol error probability detection
[AD-A142465] N84-30849
Nonlinear real-time optical signal processing
[AD-A142619] N84-30956
SIGNAL TO NOISE RATIOS
An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array
[AD-A142478] N84-30159
SIGNATURE ANALYSIS
The effect of point-spread function interaction with radiance from heterogeneous scenes on multitemporal signature analysis — soybean stress N84-30400
SILANES
Survey of the preparation, purity, and availability of silanes
[DE84-000090] N84-30084
SILICON
Method and apparatus for producing high purity silicon
[DE84-011087] N84-30090
New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30866
Silicon crystal growing by oscillating crucible technique
[DE84-011038] N84-31019
SILICON ALLOYS
Analysis of localized microstructural changes in dynamically consolidated metal powders
[DE84-006298] N84-30026
SILICON CARBIDES
Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4
[DE84-012336] N84-30052
SILICON DIOXIDE
Experimental studies of laterally seeded recrystallized polysilicon on silicon dioxide
[AD-A142382] N84-30077
SILICON FILMS
Experimental studies of laterally seeded recrystallized polysilicon on silicon dioxide
[AD-A142382] N84-30077
SILICON NITRIDES
Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4
[DE84-012336] N84-30052
Joining silicon nitride based ceramics: A technical assessment
[DE84-011356] N84-30092
SILICON OXIDES
Coated silica shells: An advanced hydrogen storage system
[DE84-008966] N84-30088
SILICON POLYMERS
Experimental studies of laterally seeded recrystallized polysilicon on silicon dioxide
[AD-A142382] N84-30077
SILICONES
Field repair of AH-16 helicopter window cutting assemblies
[NASA-TM-85831] N84-29864
Some considerations on silicone oil in high-current and energy-disconnecting mechanisms
[DE84-011021] N84-30203
SIMULATION
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1984-1, 218/ January - February
[ESA-TT-858] N84-29850
A NDT ignition delay predictive tool N84-29958
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983
A simulation program with latency exploitation for the transient analysis of digital circuits
[AD-A142377] N84-30181
SIMULATORS
UV laser triggering of crowbars used in the Sandia lightning simulator
[DE84-009064] N84-30199
Lightning simulator circuit parameters and performance for severe-threat, high-action-integral testing
[DE84-009065] N84-30211
SINGLE CRYSTALS
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer
N84-30865
Elastic domain wall waves in ferroelectric ceramics and single crystals
[AD-A142393] N84-31011
Cation self-diffusion in Fe2O3
[DE84-009152] N84-31025
SINGULARITY (MATHEMATICS)
Singular value decomposition with systolic arrays
[NASA-CR-172396] N84-30817
SINTERING
The role of sintering in the oxidation-reduction of palladium powders
[DE84-011202] N84-30059
Low temperature sintering of Al2O-CaO
[DE84-010713] N84-30083
Investigation of the role of sintering in gas-solid interactions
[DE84-010862] N84-30089
Development of a lightweight nickel electrode
[NASA-TM-83739] N84-30528
SITE SELECTION
Seismicity of the Paradox Basin and the Colorado Plateau interior
[DE84-011620] N84-30516
Overview of wind turbine siting considerations
[DE84-011686] N84-30547
On-site analysis to assess the feasibility of wind power
[DE84-009762] N84-30606
Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada
[DE84-009032] N84-30610
SKIN (ANATOMY)
Chronic effects of repeated mechanical trauma to the skin: A description of the problem in the workplace
[PB84-181767] N84-30695
SKIN (STRUCTURAL MEMBER)
Impact dynamics research on composite transport structures N84-29975
SKIN FRICTION
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1984-1, 218/ January - February
[ESA-TT-858] N84-29850
SKIRTS
Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954
SKY BRIGHTNESS
Daylight availability as a function of atmospheric conditions
[DE84-007973] N84-30609
SLABS
A study of distributed millimeter-wave isolators
[AD-A142729] N84-30189
SLEEP
Individual distinctions of human sleeping respiration at altitude of 4200 meters N84-30663
SLIDING FRICTION
Friction in low speed lubricated rolling and sliding contacts
[VTT-16] N84-30318
SLURRIES
Magnesia refractories produced from chemically modified periclase grains and Mg(OH)2 slurries
[PB84-178979] N84-30099
SNOW
Backscatter measurements on snow covered terrain at 94 GHz — radar
[REPT-4-84] N84-30144
SNOW COVER
Snow reflectance from LANDSAT-4 Thematic Mapper
N84-30426
SODIUM SULFATES
Corrosion of 5083 aluminum by aqueous sodium sulfate
[DE84-012033] N84-30045
SOFTWARE ENGINEERING
Computer science and technology: Introduction to software packages
[NBS-SP-500-114] N84-30740
CHART and SKETCH: An interactive computer graphics program
[AD-A141997] N84-30744
DCP (Distributed software engineering control process): Experience in bootstrapping an Ada (trademark) environment
[AD-P003424] N84-30756
Experience with Ada (trademark) for the Graphical Kernel System
[AD-P003426] N84-30758
An advanced host-target environment for the military computer family
[AD-P003428] N84-30760
Ada (trademark) as a program design language: Have the major issues been addressed and answered?
[AD-P003430] N84-30762
Seeding the Ada (trademark) software components industry
[AD-P003432] N84-30764
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers exercise guide
[AD-A142429] N84-30767

Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers' guide: Volume 1
[AD-A142430] N84-30768
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers guide: Volume 2
[AD-A142431] N84-30769
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers guide
[AD-A142432] N84-30770
Guide to graphics at ANL, revised
[DE84-013189] N84-30786
Singular value decomposition with systolic arrays
[NASA-CR-172396] N84-30617
SOFTWARE TOOLS
Logic machine architecture inference mechanisms: Layer 2 user reference manual release 2.0
[DE84-012115] N84-30728
Improvements to software maintenance methods in real time embedded aviation flight systems
[AD-A141949] N84-30742
SOIL MAPPING
Preliminary evaluation of TM for soils information
N84-30427
SOIL MECHANICS
Hybrid modeling of soil-structure interaction in layered media
[PB84-192178] N84-30137
SOIL MOISTURE
INFIL1D: A quasi-analytical model for simulating one-dimensional, constant flux infiltration
[DE84-008905] N84-30250
Thematic Mapper spectral dimensionality and data structure N84-30387
Research activities of the Geodynamics Branch
[NASA-TM-86123] N84-30455
Soil moisture from temperature measurements at the Earth's surface, update N84-30474
SOILS
Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys
[DE84-012547] N84-30519
SOLAR ACTIVITY
Monthly mean determination of the solar semidiurnal surface pressure oscillation at Batavia from 1866 through 1944
[PB84-184795] N84-30593
Solar-geophysical data number 473. Part 1: (Prompt reports) data for December 1983, November 1983 and late data
[PB84-180611] N84-31073
Solar-geophysical data number 473. Part 2: (Comprehensive reports) data for July 1983, March 1981 and miscellanea
[PB84-180629] N84-31074
SOLAR ACTIVITY EFFECTS
Solar-geophysical data number 473. Part 1: (Prompt reports) data for December 1983, November 1983 and late data
[PB84-180611] N84-31073
SOLAR BLANKETS
Multi-100kW: Planar low cost solar array development
[NASA-CR-171119] N84-30529
SOLAR CELLS
Low cost, sprayed CuInSe2 solar cell research
[DE84-010480] N84-30533
Spray pyrolysis of cadmium sulfide/copper indium selenide cells
[DE84-004491] N84-30537
Silicon crystal growing by oscillating crucible technique
[DE84-011036] N84-31019
Chemical vapor deposition of amorphous semiconductor films
[DE84-004489] N84-31026
SOLAR COLLECTORS
Requirements for high-temperature air-cooled central receivers
[DE84-000061] N84-30534
Performance tests of the Solar Steam, Incorporated, 9-m deep-dish solar concentrating collector
[DE84-000079] N84-30535
SOLAR COOLING
Simplified method for estimating the cooling loads of passive solar systems
[DE84-009474] N84-30538
Selected bibliography of solar thermal literature. Volume 1: Bibliography
[DE84-011386] N84-31052
SOLAR CORONA
White light solar corona: An atlas of 1983 K-coronameter synoptic charts
[PB84-184159] N84-31075
SOLAR ECLIPSES
Lageos orbit and solar eclipses N84-30465
SOLAR ENERGY
Open cycle lithium chloride cooling system
[DE84-005831] N84-30234
Development of alternative energy science and engineering in the Caribbean
[PB84-181106] N84-30552
SLR-PLUS version 1.0 reference manual
[DE84-009180] N84-30781
Selected bibliography of solar thermal literature. Volume 1: Bibliography
[DE84-011386] N84-31052
Appropriate technology management information system
[DE84-010952] N84-31056
SOLAR ENERGY CONVERSION
Photovoltaic-electrolyzer system transient simulation results
[DE84-010217] N84-29995
Engineering scoping study of the production of hydrogen and oxygen from the cerium oxide-sodium phosphate/carbonate thermochemical cycle
[DE84-010629] N84-29998
Theoretcial studies of solar-pumped lasers
[NASA-CR-173833] N84-30274
Photo/Biological Hydrogen Principal Investigators Review Meeting: Proceedings of the May 1983 Program Review
[DE84-000083] N84-30536
Proceedings of the DOE Physical and Chemical Energy Storage Annual Contractors' Review Meeting
[DE83-017536] N84-30540
Electrochromic materials for the regulation of solar energy transmission through windows
[DE84-012165] N84-31029
SOLAR FLARES
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076
Solar-geophysical data comprehensive reports, February 1984, number 474. Part 2: Data for August 1983, April 1981 and miscellanea. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188671] N84-31077
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
SOLAR HEATING
Simplified method for estimating the cooling loads of passive solar systems
[DE84-009474] N84-30538
Selected bibliography of solar thermal literature. Volume 1: Bibliography
[DE84-011386] N84-31052
SOLAR MAGNETIC FIELD
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
SOLAR NEUTRINOS
The 19th Moriond meeting: Summary talk
[DE84-010053] N84-31072
SOLAR PROTONS
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
SOLAR RADIATION
Inevitable climatic changes N84-30480
Solar Radiation Data Directory: A guide to solar radiation and meteorological data collection activities in the US
[DE84-000095] N84-31057
The NOAA-ERL-ARL solar UV radiation and climate research project program description
[PB84-183292] N84-31070
SOLAR RADIO BURSTS
Fundamental and harmonic emission in interplanetary type 2 radio bursts
[NASA-TM-86099] N84-31079
SOLAR RADIO EMISSION
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076
Solar-geophysical data comprehensive reports, February 1984, number 474. Part 2: Data for August 1983, April 1981 and miscellanea. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188671] N84-31077
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
SOLAR ROTATION
White light solar corona: An atlas of 1983 K-coronameter synoptic charts
[PB84-184159] N84-31075
SOLAR SPECTRA
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86285] N84-30586
SOLAR THERMAL PROPULSION
AFRPL solar-thermal rocket activities N84-29938
SOLAR WIND
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188629] N84-31076
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
SOLAR X-RAYS
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
SOLDERING
The evaluation and approval of automatic machine wave soldering for ESA spacecraft hardware
[ESA-PSS-01-707] N84-30215
SOLENOIDS
Magnetic suspension and balance system study
[NASA-CR-3802] N84-29888
Electron motion in solenoidal magnetic fields using a first order symplectric integration algorithm
[DE84-011341] N84-30910
SOLID ELECTROLYTES
The photoelectrochemistry of conducting polymers
[DE84-010889] N84-30093
Steam reforming of fuel to hydrogen in fuel cell
[DE84-011115] N84-30205
Electrolytic degradation of lithia-stabilized polycrystalline beta-alumina
[DE84-008668] N84-31027
SOLID PROPELLANT IGNITION
A NDT ignition delay predictive tool N84-29958
SOLID PROPELLANT ROCKET ENGINES
Stress transducer interpretation analysis and stability data N84-29957
Low cost manufacturing of tactical rocket motors
N84-29959
SOLID PROPELLANTS
Nonlinear structural characterization of solid propellants N84-29951
Kevlar-49/epoxy case skirt structural fatigue strength
N84-29955
Synthesis of diazidodiesters N84-29956
SOLID ROCKET BINDERS
Durability of adhesive bonds with ionic bonds at the interface — propellant binder adhesion N84-29960
Interfacial interaction and adhesion in composite materials N84-29961
High energy binders
[AD-A142347] N84-30105
SOLID ROCKET PROPELLANTS
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1984-1, 218/ January - February
[ESA-TT-858] N84-29850
SOLID SOLUTIONS
Investigation of the structure of photosynthetic reaction centers
[DE84-012475] N84-30005
The effects of solid solution temperatures and cooling rates on the microstructures of BT3-1 titanium alloy
N84-30066
SOLID STATE DEVICES
Solid state compressor
[AD-A142605] N84-30300
SOLID-SOLID INTERFACES
Interfacial interaction and adhesion in composite materials N84-29961
SOLIDIFICATION
A study of the dependence of microsegregation on critical solidification parameters in rapidly-quenched structures
[AD-A142293] N84-30019
Formation of dispersions of rare earth oxides in titanium alloys using rapid solidification processing
[DE84-008664] N84-30048
SOLIDS
Diffusion of gases in porous solids: Simulations and measurements
[DE84-010822] N84-30241

TOPAZ: A finite element heat conduction code for analyzing 2-D solids [DE84-010676] N84-30247
Vibrational studies of the structure of disordered solids [AD-A142297] N84-30338
Photoemission studies of mixed valent systems [DE84-010797] N84-31020
Solid surface luminescence analysis [DE84-011254] N84-31022

SOLITARY WAVES
Soliton collapse during ionospheric heating [DE84-009994] N84-30576

SOLUBILITY
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review [DE84-009432] N84-30557

SOLUTES
Transient and diffusion analysis of HgCdTe [NASA-CR-162049] N84-30015
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review [DE84-009432] N84-30557

SOLVATION
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits [AD-A142333] N84-29981

SOLVENTS
Solvent, ligand, and ionic charge effects on reaction entropies for simple transition-metal redox couples [AD-A142374] N84-29984
The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings [MRL-R-924] N84-30332

SONOGRAMS
Ultrasonography of canine soft tissues during decompression N84-30653

SOUND INTENSITY
On measuring the acoustic intensity of hydroacoustic sources [AD-A142484] N84-30893

SOUND PRESSURE
Effect of turbulent boundary layer flow on measurement of acoustic pressure and intensity, revised [AD-A142473] N84-30229

SOUND TRANSDUCERS
Method and apparatus for measuring stress [DE84-011035] N84-30347

SOUND TRANSMISSION
Wind-generated noise in shallow water [AD-A141981] N84-30890

SOUND WAVES
Excitation of sound by light N84-30863
A finite element method for treating nearly one way wave propagation [DE84-010294] N84-30889
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions [AD-A142420] N84-30892
Propagation of acoustic waves in partially saturated porous media [DE84-010536] N84-30896

SOUTH DAKOTA
Study of Thematic Mapper and Multispectral Scanner data applications N84-30421

SPACE CHARGE
High-current, low-energy synchrotrons and compressor rings [DE84-012104] N84-30906

SPACE COMMERCIALIZATION
Land Remote-Sensing Commercialization Act of 1984 [H-REPT-98-647] N84-31063

SPACE COMMUNICATION
MMIC technology for advanced space communications systems [NASA-TM-83749] N84-30147

SPACE COOLING (BUILDINGS)
Integrated gas-fired space heating/water heating system with electric air conditioning [PB84-181999] N84-30138
Simplified method for estimating the cooling loads of passive solar systems [DE84-009474] N84-30538
SLR-PLUS version 1.0 reference manual [DE84-009180] N84-30781

SPACE ENVIRONMENT SIMULATION
European Space Tribology Laboratory: Facilities, services, capabilities [ESA-BR-12] N84-30317

SPACE ERECTABLE STRUCTURES
Multi-100kW: Planar low cost solar array development [NASA-CR-171119] N84-30529

SPACE FLIGHT
Proceedings of the Symposium on Mechanics for Space Flight [ISAS-SP-2] N84-30114

SPACE HEATING (BUILDINGS)
Integrated gas-fired space heating/water heating system with electric air conditioning [PB84-181999] N84-30138
Simplified method for estimating the cooling loads of passive solar systems [DE84-009474] N84-30538
Environmental effects of increasing the amount of district heating in the Netherlands [S/T-REPT-VOL-1-NO-5] N84-30558
SLR-PLUS version 1.0 reference manual [DE84-009180] N84-30781

SPACE LABORATORIES
The use of space laboratories for materials investigations, process engineering, and scientific purposes N84-29895

SPACE PLASMAS
Some contributions to knowledge of the magnetospheric plasma by ISEE investigators [NASA-TM-86124] N84-30962
Studies of X-ray clusters of galaxies/intergalactic plasmas [NASA-CR-173825] N84-31068

SPACE POWER REACTORS
Heat pipe technology issues [DE84-011384] N84-30248
Some scoping experiments for a space reactor [DE84-009101] N84-30941

SPACE PROGRAMS
Space nuclear safety program [DE84-011015] N84-30943

SPACE SHUTTLE MAIN ENGINE
The 1984 JANNAF Propulsion Meeting, volume 1 [AD-A142852] N84-29906
Shuttle orbiter main propulsion system hardware development and certification for flight N84-29907
SSME modifications for on-demand launch vehicles N84-29914
Techniques for fatigue life predictions from measured strains [NASA-CR-171118] N84-30334

SPACE SHUTTLE ORBITERS
Space Shuttle Orbiter improved auxiliary power unit N84-29965
Viscous computation of a space shuttle flow field [NASA-TM-85977] N84-30225

SPACE SHUTTLES
STS-13 (41-C) BET products [NASA-CR-172350] N84-29901
Shuttle payload improvement by low risk modifications to the OMS engine N84-29925

SPACE STATIONS
The 1984 JANNAF Propulsion Meeting, volume 1 [AD-A142852] N84-29906
Very low thrust and low chamber pressure GO2/GH2 thruster technology N84-29910
Low thrust bipropellant engine development N84-29912
Factors that influence space station propulsion requirements N84-29931
Cost evaluation of space station propulsion system options N84-29932
An integrated space station propulsion system N84-29933
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
Thrust level requirements for space station on-orbit propulsion N84-29935

SPACE TRANSPORTATION
Geokinetic effects on motion sensitive instrumentation, systems and facilities [AD-A142682] N84-30575

SPACE TRANSPORTATION SYSTEM
STS-13 (41-C) BET products [NASA-CR-172350] N84-29901
The space transportation system reaction control system and orbital maneuvering subsystem N84-29908

SPACE-TIME FUNCTIONS
Computer-generated movie on the short pulse electromagnetic behavior of wire objects [DE84-012032] N84-30162

SPACEBORNE EXPERIMENTS
Trace constituants measurements deduced from spectrometric observations onboard Spacelab [AERONOMICA-ACTA-A-286-1984] N84-30565

SPACECRAFT CONFIGURATIONS
Factors that influence space station propulsion requirements N84-29931
Cost evaluation of space station propulsion system options N84-29932
Thrust level requirements for space station on-orbit propulsion N84-29935

SPACECRAFT CONSTRUCTION MATERIALS
Air force technical objective document FY 85 [AD-A141925] N84-31033

SPACECRAFT CONTROL
Very low thrust and low chamber pressure GO2/GH2 thruster technology N84-29910
Dual mode propulsion system engine testing for INTELSAT N84-29913
An integrated space station propulsion system N84-29933
Thrust level requirements for space station on-orbit propulsion N84-29935

SPACECRAFT DESIGN
Tracking and Data Relay Satellite launch recovery mission N84-29918
Factors that influence space station propulsion requirements N84-29931
Cost evaluation of space station propulsion system options N84-29932
An integrated space station propulsion system N84-29933
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
The liquid bipropellant stage concept: Filling the OTV gap N84-29936
Propulsion issues for advanced orbit transfer vehicles N84-29937

SPACECRAFT ELECTRONIC EQUIPMENT
MMIC technology for advanced space communications systems [NASA-TM-83749] N84-30147

SPACECRAFT ENVIRONMENTS
Effect of living conditions in confined space on formation of bacterial aerosol N84-30659

SPACECRAFT INSTRUMENTS
Drift scintillation meter [AD-A142523] N84-30968

SPACECRAFT LAUNCHING
Propulsion options for orbit-on-demand N84-29915

SPACECRAFT LUBRICATION
European Space Tribology Laboratory: Facilities, services, capabilities [ESA-BR-12] N84-30317

SPACECRAFT MODULES
The liquid bipropellant stage concept: Filling the OTV gap N84-29936

SPACECRAFT ORBITS
An integrated space station propulsion system N84-29933
Thrust level requirements for space station on-orbit propulsion N84-29935

SPACECRAFT POWER SUPPLIES
Space Shuttle Orbiter improved auxiliary power unit N84-29965
Multi-100kW: Planar low cost solar array development [NASA-CR-171119] N84-30529

SPACECRAFT PROPULSION
Propulsion options for orbit-on-demand N84-29915
MPD thruster comparisons with advanced chemical systems for auxiliary propulsion applications N84-29928
Factors that influence space station propulsion requirements N84-29931
Cost evaluation of space station propulsion system options N84-29932
An integrated space station propulsion system N84-29933
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934
Thrust level requirements for space station on-orbit propulsion N84-29935
Propulsion issues for advanced orbit transfer vehicles N84-29937
An MPD thruster with liquid metal injection [ISAS-610] N84-30103

SPACECRAFT STRUCTURES
Dynamic synthesis and evaluation of spacecraft structures [ESA-STR-208] N84-29904

SPACELAB
Space research in Belgium, 1982-1983 N84-31084

SPAIN
Preliminary report of HF radar measurements of surface currents east of the Strait of Gibraltar near Marbella, Spain, 7-22 October 1982, part 2 [PB84-183664] N84-30637

SPARK GAPS
UV laser triggering of crowbars used in the Sandia lightning simulator [DE84-009064] N84-30199

SPARKS
The gas-heating phase in electrical breakdown [AD-A141961] N84-30967

SPATIAL DISTRIBUTION
TM failed detectors data replacement N84-30382
Assessment of Thematic Mapper band-to-band registration by the block correlation method N84-30396
Biological oceanography N84-30437

Spatial distribution of advective heat influxes in atmosphere over Northern Hemisphere and its relationship to heat influxes from ocean N84-30482
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069
SPATIAL FILTERING
Holographic image subtraction by recording in Fourier plane and space filtration with thin light beam
N84-30862
SPATIAL MARCHING
Random-choice solutions for two-dimensional and axisymmetric supersonic flows N84-30115
SPATIAL RESOLUTION
Thematic Mapper (TM) instrument description
N84-30363
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30360
Scan-angle and detector effects in Thematic Mapper radiometry N84-30386
Assessment of Thematic Mapper band-to-band registration by the block correlation method N84-30396
Impact of Thematic Mapper sensor characteristics on classification accuracy N84-30410
Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411
Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results — Death Valley, California, Cement-Velma, Oklahoma; Big Horn and Wind River Basins, Wyoming; Spanish Peaks, Colorado; and the Four Corners area (Paradox Basin of Utah and Colorado) N84-30412
Preliminary evaluation of Thematic Mapper image data quality N84-30415
Quick look analysis of TM data of the Washington, District of Columbia area N84-30418
Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429
Measurements of spatially resolved high resolution spectra of laser-produced plasmas
[DE84-012418] N84-30995
SPECIFIC IMPULSE
MPD thruster comparisons with advanced chemical systems for auxiliary propulsion applications
N84-29928
The liquid bipropellant stage concept: Filling the OTV gap N84-29936
SPECIFICATIONS
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures
[AD-A142424] N84-29866
The evaluation and approval of automatic machine wave soldering for ESA spacecraft hardware
[ESA-PSS-01-707] N84-30215
Requirements for high-temperature air-cooled central receivers
[DE84-000081] N84-30534
SPECTRA
Fundamental and harmonic emission in interplanetary type 2 radio bursts
[NASA-TM-86099] N84-31079
SPECTRAL BANDS
Thematic Mapper Image Processing System (TIPS) processing status N84-30368
Relative radiometric calibration of LANDSAT TM reflective bands — San Francisco, California
N84-30374
Evaluation of the radiometric integrity of LANDSAT-4 Thematic Mapper band 6 data N84-30375
Thermal band characterization of LANDSAT-4 Thematic Mapper — Buffalo, New York and water temperature in Lake Erie N84-30376
TM failed detectors data replacement N84-30382
In-flight absolute radiometric calibration of the Thematic Mapper N84-30383
LANDSAT-4 Thematic Mapper calibration and atmospheric correction N84-30384
Intraband radiometric performance of the LANDSAT-4 Thematic Mapper N84-30389
Investigation of TM band-to-band registration using the JSC registration processor N84-30398
Radiometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) data — Vermont
N84-30401
Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411
Spectral and invertibility properties of band matrices
[AD-A142637] N84-30631
Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30864
SPECTRAL CORRELATION
LANDSAT-4 MSS and TM spectral class comparison and coherent noise analysis — The Des Moines, Iowa area N84-30381
TM failed detectors data replacement N84-30382
Thematic Mapper spectral dimensionality and data structure N84-30387
MTF analysis of LANDSAT-4 Thematic Mapper
N84-30388
Analysis of LANDSAT-4 TM data for lithologic and image mapping purpose N84-30390
Assessment of Thematic Mapper band-to-band registration by the block correlation method N84-30396
SPECTRAL METHODS
A high-resolution target-tracking concept using spectral estimation techniques
[AD-A141921] N84-30149
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596
Spectral methods for compressible flow problems
[NASA-CR-172385] N84-30816
SPECTRAL RECONNAISSANCE
Geology N84-30442
SPECTRAL REFLECTANCE
Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data
N84-30419
SPECTRAL RESOLUTION
Thematic Mapper (TM) instrument description
N84-30363
Spectral characterization of the LANDSAT Thematic Mapper sensors N84-30372
Investigation of TM band-to-band registration using the JSC registration processor N84-30398
Spectral characterization of the LANDSAT-4 MSS sensors N84-30402
Impact of Thematic Mapper sensor characteristics on classification accuracy N84-30410
Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411
Quick look analysis of TM data of the Washington, District of Columbia area N84-30418
Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424
The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30428
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429
SPECTRAL SENSITIVITY
Pre-launch absolute radiometric calibration of LANDSAT-4 protoflight Thematic Mapper N84-30373
Relative radiometric calibration of LANDSAT TM reflective bands — San Francisco, California
N84-30374
Thermal band characterization of LANDSAT-4 Thematic Mapper — Buffalo, New York and water temperature in Lake Erie N84-30376
LANDSAT-4 MSS and TM spectral class comparison and coherent noise analysis — The Des Moines, Iowa area N84-30381
Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results — Death Valley, California, Cement-Velma, Oklahoma; Big Horn and Wind River Basins, Wyoming; Spanish Peaks, Colorado; and the Four Corners area (Paradox Basin of Utah and Colorado) N84-30412
SPECTRAL SIGNATURES
Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413
SPECTROGRAPHS
Studies of X-ray clusters of galaxies/intergalactic plasmas
[NASA-CR-173825] N84-31068
SPECTROMETERS
High resolution, high rate X-ray spectrometer
[DE84-011116] N84-30266
Measurements of high resolution spectra on the Omega laser at Rochester University
[DE84-012419] N84-30290
Measurements of spatially resolved high resolution spectra of laser-produced plasmas
[DE84-012418] N84-30995
SPECTROPHOTOMETERS
Microspectrophotometer for crystal analysis by absorption reflectometry N84-30883
SPECTROSCOPY
Resonance ionization spectroscopy of argon, krypton and xenon using vacuum ultraviolet light
[DE84-011655] N84-30006
Characterization of the microstructures of various materials
[AD-A141946] N84-30017
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922
SPECTRUM ANALYSIS
Trace analysis in quartz
[AD-A142425] N84-29968
Investigation of the structure of photosynthetic reaction centers
[DE84-012475] N84-30005
LANDSAT-4 MSS and TM spectral class comparison and coherent noise analysis — The Des Moines, Iowa area N84-30381
Interpreting spectra of sea surface aerial photographs
N84-30494
SPEECH RECOGNITION
Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation
[AD-A142554] N34-30160
Voice Interactive Systems Technology (VIST) research
[AD-A142698] N84-30726
SPERMATOZOA
Use of sperm enzymes to detect genotoxic agents
[AD-A142724] N84-30691
SPHERICAL ANTENNAS
The Technical University of Denmark (TUD)-ESA spherical near field antenna test facility, Lyngby, Denmark
[ESA-BR-19] N84-29890
SPHERICAL HARMONICS
Lageos orbit and the albedo problem N84-30464
SPHERICAL SHELLS
Coated silica shells: An advanced hydrogen storage system
[DE84-006986] N84-30088
Heating and implosion of spherical targets irradiated by laser N84-30679
SPHEROMAKS
Equilibrium and stability of the Los Alamos spheromak
[DE84-010064] N84-30975
Space resolved absolutely calibrated VUV spectroscopic measurements on CTX
[DE84-007490] N84-30984
Mixed mode operation in CTX
[DE84-007493] N84-30985
Ohmic heating to 100-eV and helicity injection in CTX
[DE84-007494] N84-30986
Confinement time and energy balance in the CTX spheromak
[DE84-007491] N84-30987
Analysis of surface currents on the CTX mesh flux conserver
[DE84-007491] N84-30989
SPILLING
The evaporation and gaseous dispersion of large-scale releases of nitrogen tetroxide
[AD-A142079] N84-30104
SPIN DYNAMICS
Introduction to neutron scattering by magnetic excitations
[DE84-008579] N84-30904
Nuclear and particle physics aspects of hyperon and antinucleon interactions
[DE84-010793] N84-30905
Hypernuclear research at the AGS
[DE84-010282] N84-30915
High-spin gamma-ray spectroscopy
[DE84-010716] N84-30929
SPIN STABILIZATION
Low thrust bipropellant engine development
N84-29912
SPINAL CORD
Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678
Information processing for use in the treatment of severely physically handicapped persons N84-30711
SPRAY CHARACTERISTICS
A theoretical and experimental study of turbulent nonevaporating sprays
[NASA-CR-174668] N84-29877

SPRAYED COATINGS
Low cost, sprayed CuInSe2 solar cell research
[DE84-010460] N84-30533
SPUTTERING
Sputter-deposited metallic and ceramic coatings for heat engines
[DE84-011401] N84-30030
RF sputtering and annealing of amorphous zinc telluride films
[USIP-84-04] N84-30061
Computer simulation studies of sputtering and multimer formation from clean and oxygen reacted surfaces of titanium, vanadium and niobium
[AD-A141998] N84-31009
STABILITY
Inductively stabilized, long pulse duration transverse discharge apparatus
[DE84-011301] N84-30281
Soliton collapse during ionospheric heating
[DE84-009994] N84-30576
Some design guidelines and discrete-time adaptive controllers
[NASA-CR-173800] N84-30808
Instability of collapsing cylindrical shell during magnetic energy density N84-30872
STABILITY TESTS
Stability of tubes conveying fluid
[DE84-010573] N84-30240
STABILIZATION
Stabilization studies
[AD-A142644] N84-30832
STABILIZERS (AGENTS)
Karnovsky-osmium as a primary fixative for electron microscopy
[AD-A142671] N84-30957
STABILIZERS (FLUID DYNAMICS)
Wind tunnel tests on a tube-launched missile configuration with a deflectable nose control and a novel wrap-around fin stabiliser
[AD-A142082] N84-29900
STABLE OSCILLATIONS
Orbital stability in combined uniform axial and three-dimensional wiggler magnetic fields for free-electron lasers
[NASA-TM-83753] N84-30273
STAINLESS STEELS
Very low thrust and low chamber pressure GO2/GH2 thruster technology N84-29910
The compatibility of MON-3 and 301 cryoformed stainless steel N84-29924
The influence of nitrogen on the sensitization, corrosion, mechanical and microstructural properties of stainless steels
[DE83-017203] N84-30050
Corrosion of unalloyed steels in different alkaline solutions at high temperatures and under high pressures
[S/T-REPT-VOL-1-NO-1] N84-30060
Upset weld study for joining 304L stainless steel tubes
[DE84-011507] N84-30313
STANDARDIZATION
Seeding the Ada (trademark) software components industry
[AD-P003432] N84-30764
Enhancements to the codata definition language
[DE84-010579] N84-30783
Serial link protocol design: A critique of the X.25 standard, level 2
[DE84-002724] N84-30806
Improving system affordability
[AD-A142387] N84-31062
STANDARDS
Eyebolts for lift suspension
[NPL-DMA(A)70] N84-30292
Robotic deburring. Part 1: Preliminary observations
[DE84-010766] N84-30305
Computer science and technology: Report on approaches to database translation
[NBS-SP-500-115] N84-30739
STARTING
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29879
STATIC TESTS
The compatibility of MON-3 and 301 cryoformed stainless steel N84-29924
STATIONKEEPING
Low thrust bipropellant engine development
N84-29912
STATISTICAL ANALYSIS
Calculation of the statistical characteristics of surface
[NASA-TM-77462] N84-30222
Tensile crack exposure tests. Statistical analysis of the long-term durability of series B beams
[AD-A141955] N84-30335
Assessment of Thematic Mapper band-to-band registration by the block correlation method N84-30396
Prediction of slant wind shear with an offset tower observation system
[AD-A142676] N84-30600
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30606
US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141810] N84-30627
STATISTICAL TESTS
Durability methods development, volume 7
[AD-A142400] N84-29865
Theory and applications of random fields
[AD-A142346] N84-30847
STATISTICAL WEATHER FORECASTING
Prediction of slant wind shear with an offset tower observation system
[AD-A142676] N84-30600
STEADY FLOW
Optimization of a numerical method to calculate elliptic flows
[DFVLR-FB-84-16] N84-30252
STEADY STATE
A steady-state version of a dynamic optimal budgeting problem
[AD-A142281] N84-31034
STEEL STRUCTURES
Characterization of submerged-arc and gas-metal-arc weldments in hY-100 steel
[AD-A141839] N84-30298
STEELS
Survey and analysis of materials research and development at selected federal laboratories
[DE84-008904] N84-29967
Thermomechanical processing and texture development in Ni-Cr-Mo and Mn-Mo-B armor steels
[AD-A142352] N84-30020
Application of electrochemical and mechanical impedance measurements to corrosion induced failures
[AD-A142468] N84-30021
J-integral tearing instability analysis for 8-inch diameter ASTM A106 steel pipe
[AD-A142589] N84-30023
Analysis of localized microstructural changes in dynamically consolidated metal powders
[DE84-006296] N84-30026
Transmutation of manganese: Substituted steels in STARFIRE
[DE84-010402] N84-30035
Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests
[DE84-012833] N84-30054
Mechanical properties of a shock consolidated steel powder
[DE84-003573] N84-30056
Environmental assisted fracture of cast and wrought steels in brine
[DE84-011870] N84-30058
Aeronautical Materials (selected articles)
[AD-A139952] N84-30063
Preliminary investigation of fatigue crack propagation of 30CrMnSiA steel in salt spray corrosion conditions
N84-30068
The effects of non-metallic inclusions in steel on fatigue properties N84-30070
STEERING
Summaries of doctorate theses — man machine systems N84-30705
STELLAR ENVELOPES
The galactic acceleration of ultrahigh energy cosmic rays
[DE84-012442] N84-31080
STELLAR MASS EJECTION
Solar-geophysical data comprehensive reports, February 1984, number 474. Part 2: Data for August 1983, April 1981 and miscellanea. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188671] N84-31077
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078
STELLAR MODELS
The NOAA-ERL-ARL solar UV radiation and climate research project program description
[PB84-183292] N84-31070
STELLAR OCCULTATION
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86285] N84-30566
STELLARATORS
Ring-type support concept for twisted coils (finite element simulation) — stellarators
[IPP-2/271] N84-30327
Magnetohydrodynamic equilibrium and stability of stellarators
[DE84-010731] N84-30994
STEPPING MOTORS
Prediction and analysis of variable reluctance stepmotor drive systems
[NLR-TR-81139-U] N84-30216
STEREOSCOPY
PRISM: A practical real-time imaging stereo matcher
[AD-A142532] N84-30686
STIFFNESS
A study of stiffness, residual strength and fatigue life relationships for composite laminates
[NASA-CR-172211] N84-29976
STIFFNESS MATRIX
Formulation of stiffness matrices for elastic buckling of thin-walled open section prismatic columns
[TT-8402] N84-30353
STIMULATED EMISSION DEVICES
Efficient forward conversion in a Raman generator
[DE84-007466] N84-30285
STOCHASTIC PROCESSES
State estimation and control of conditionally linear systems
[AD-A142455] N84-30826
Input-output parametric models for nonlinear systems. Part 2: Stochastic nonlinear systems
[RR-252-PT-2] N84-30845
Theory and applications of random fields
[AD-A142346] N84-30847
Asymmetric Weiner-Poisson control
[AD-A142452] N84-30843
Stochastic quantization: Stabilizing quantum models
[REPT-80] N84-31032
STOKES LAW (FLUID MECHANICS)
Growth and characterization of metal oxide whiskers for aerosol filtration
[DE84-011049] N84-31021
STOMACH
Human stomach motor and evacuatory functions during antiorthostatic hypokinesia N84-30649
STORAGE BATTERIES
Secondary alkaline batteries
[DE84-010963] N84-30191
Battery Energy Storage Test (BEST) facility
[DE84-012127] N84-30548
STORAGE RINGS (PARTICLE ACCELERATORS)
Simulation of ultra-low emittance electron storage rings
[DE84-012050] N84-31024
STORMS (METEOROLOGY)
Debris Flows, Landslides, and Floods in the San Francisco Bay Region, January 1982: Overview and summary of a conference
[PB84-194737] N84-30590
STRAIN GAGE BALANCES
Development of a 6-component balance for the cryogenic range
[BMFT-FB-W-84-022] N84-30270
STRAIN GAGES
Stress transducer interpretation analysis and stability data N84-29957
STRAIN HARDENING
Ring ductility of irradiated Inconel 706 and Nimonic PE16
[DE84-010397] N84-30034
STRAIN RATE
A tractable theory for nonlinear propellant response and cumulative damage predictions N84-29950
Nonlinear structural characterization of solid propellants N84-29951
The effects of strain rate and temperature on the fracture behavior of three structural adhesives
[AD-B084418] N84-30097
STRATEGY
Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense
[AD-A141982] N84-30721
STRATIFICATION
Hybrid modeling of soil-structure interaction in layered media
[PB84-192178] N84-30137
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery
[PB84-184894] N84-30550
STRATIFIED FLOW
Thermal laminarization of a stratified pipe flow
[DE84-006407] N84-30236

STRATIGRAPHY
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416
An assessment of methods of geological basin analysis for application to the Uinta and Piceance Basins [DE84-012369] N84-30581
Stratigraphic and volcano-tectonic relations of Crater Flat Tuff and some older volcanic units, Nye County, Nevada [DE84-010926] N84-30584
Chemical evolution of a high-level magma system: The Black Mountain Volcanic Center, Southern Nevada [DE84-013321] N84-30587

STRATOSPHERE
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model [NASA-TM-86285] N84-30566
The NOAA-ERL-ARL solar UV radiation and climate research project program description [PB84-183292] N84-31070

STREAK PHOTOGRAPHY
Photoemissive materials for 0.35 Micron laser fiducials in X-ray streak cameras [DE84-008348] N84-30283
Comparison of lightning flash rates from the PBE sensor and streak counting from the DMSP satellite [DE84-006722] N84-30602

STREAMLINING
An integral prediction method for three-dimensional flow separation [AD-A142551] N84-30231

STREAMS
Water resources data for Massachusetts and Rhode Island, water year 1982 [PB84-180009] N84-30521
Acceleration of ions and electrons by wave-particle interactions [AD-A142341] N84-30900

STRESS (PSYCHOLOGY)
Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation [AD-A142554] N84-30160

STRESS ANALYSIS
A tractable theory for nonlinear propellant response and cumulative damage predictions N84-29950
Nonlinear structural characterization of solid propellants N84-29951
Residual curing stress of carbon-resin composites [ONERA-RT-6/3521-M] N84-29960
Strains in an elastic plate containing an interference-fit bolt near a free edge [AR-003-012] N84-30333
Reliability analysis for stiff versus flexible piping [DE84-008325] N84-30344
Local bond stress-slip relationships of deformed bars under generalized excitations: Experimental results and analytical model [PB84-192848] N84-30355

STRESS CONCENTRATION
Nonlocal continuum theory for dislocation and fracture [AD-A142536] N84-30340
Method for defining the distribution of triaxial stress states in underground structures [DE84-010591] N84-30342

STRESS CORROSION
Surface layer effects on the mechanical behavior of metals [AD-A142280] N84-30018

STRESS CORROSION CRACKING
Stress-corrosion crack-growth study of titanium alloy Ti-6Al-4V exposed to Freon PCA and nitrogen tetroxide MON-1 N84-29923
Application of electrochemical and mechanical impedance measurements to corrosion induced failures [AD-A142468] N84-30021
Solving corrosion problems with surface analysis [DE84-008652] N84-30025
Mechanisms of intergranular failures in Alloy 600 in high temperature environments [DE84-010514] N84-30033
The influence of nitrogen on the sensitization, corrosion, mechanical and microstructural properties of stainless steels [DE83-017203] N84-30050
Preliminary investigation of fatigue crack propagation of 30CrMnSiA steel in salt spray corrosion conditions N84-30068

STRESS INTENSITY FACTORS
Tensile strength of composite sheets with unidirectional stringers and crack-like damage N84-29974
Solving crack problems with analytical techniques and the finite elements method [BLL-RISLEY-TR-4940-(9091.9F)] N84-30325
Calculation of crack behaviour on exposure to thermal shock [BLL-RISLEY-TR-4941-(9091.9F)] N84-30326
Methods for analysis of cracks in three-dimensional solids [NASA-TM-86266] N84-30330

STRESS MEASUREMENT
Stress transducer interpretation analysis and stability data N84-29957
Residual stress measurements using shear-horizontal waves from electromagnetic acoustic transducers [PB84-190636] N84-30171
Method and apparatus for measuring stress [DE84-011035] N84-30347

STRESS WAVES
On the extremum of bilinear functional for hyperbolic type partial differential equations [AD-A142505] N84-30628

STRESS-STRAIN RELATIONSHIPS
Synthesis of diazidodiesters N84-29956
Surface layer effects on the mechanical behavior of metals [AD-A142280] N84-30018
New experimental techniques with the split Hopkinson pressure bar [DE84-003816] N84-30268

STRESSES
Criterion for quasibrittle crack growth [DE84-010052] N84-30349
USSR report: Physics and mathematics [JPRS-UPM-84-001] N84-30862
Invention of a tunable damper for use with an acoustic waveguide in hostile environments [DE84-013109] N84-30897

STRETCH FORMING
Uniaxial draw of poly(ethylene oxide) by solid state extrusion [AD-A141923] N84-30074

STRIATION
Surface disturbances due to trailing vortices [AD-A142693] N84-30233

STRINGERS
Tensile strength of composite sheets with unidirectional stringers and crack-like damage N84-29974

STRONGLY COUPLED PLASMAS
High-latitude ionospheric irregularities [AD-A142648] N84-30573

STRUCTURAL ANALYSIS
Hybrid modeling of soil-structure interaction in layered media [PB84-192178] N84-30137
Effects of variations in coldworking repair procedures on flaw growth and structural life [AD-A141966] N84-30336
NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures [AD-A142290] N84-30337
System identification of structures with joint rotation [PB84-192210] N84-30357
Hierarchial command, control and coupled bilinear systems [AD-A142401] N84-30823

STRUCTURAL BASINS
An objective analysis technique for extrapolating tidal fields N84-30471
An assessment of methods of geological basin analysis for application to the Uinta and Piceance Basins [DE84-012369] N84-30581

STRUCTURAL DESIGN
ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures [NASA-CP-2321] N84-29969
Impact dynamics research on composite transport structures N84-29975
Postbuckling behavior of graphite-epoxy panels N84-29976
Studies of noise transmission in advanced composite material structures N84-29977
Directional extreme wind speed data for the design of buildings and other structures [PB84-178847] N84-30139
Multi-100kW: Planar low cost solar array development [NASA-CR-171119] N84-30529

STRUCTURAL DESIGN CRITERIA
Review and comparison of discrete and continuous gust methods for the determination of airplane design loads [NLR-TR-82134-U] N84-29886
Design considerations for shear links in eccentrically braced frames [PB84-192186] N84-30136

STRUCTURAL ENGINEERING
Directional extreme wind speed data for the design of buildings and other structures [PB84-178847] N84-30139
National Science Foundation, volume 1 [PB84-193234] N84-31061

STRUCTURAL PROPERTIES (GEOLOGY)
Crustal deformation and earthquakes N84-30457
Dependence of crustal structure of eastern Pacific Ocean on its age N84-30483
Structure of ocean floor in relation to conditions for formation of lithosphere N84-30484
Thermal ground water flow systems in the thrust zone in southeastern Idaho [DE84-011596] N84-30517

STRUCTURAL STABILITY
Experiments on tubes conveying fluid [DE84-004031] N84-30237
Some computational aspects of the stability analysis of nonlinear structures [NLR-MP-82034-U] N84-30351

STRUCTURAL STRAIN
Criterion for quasibrittle crack growth [DE84-010052] N84-30349

STRUCTURAL VIBRATION
An analysis of the high frequency vibrations in early Thematic Mapper scenes N84-30395

SUBMILLIMETER WAVES
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk [NASA-TM-86077] N84-31069

SUBROUTINE LIBRARIES (COMPUTERS)
Guidelines for the design of large modular scientific libraries in Ada [CWI-NM-N8401] N84-30792

SUBROUTINES
Air Force Academy Aeronautics Digest [AD-A142399] N84-29849
CHART and SKETCH: An interactive computer graphics program [AD-A141997] N84-30744

SUBSTRATES
Inventory of geothermal resources in Nebraska [DE84-009679] N84-30518

SUBURBAN AREAS
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429

SUDDEN IONOSPHERIC DISTURBANCES
Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984 [PB84-188689] N84-31076
Solar-geophysical data explanation of reports, February 1984, number 474, supplement [PB84-188697] N84-31078

SULFATES
Intermediate-range grid model and user's guide for atmospheric sulfur dioxide and sulfate concentrations and depositions: Wisconsin Power Plant Impact Study [PB84-189257] N84-30556

SULFATION
Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti [DE84-005411] N84-30043

SULFIDES
Sulfidation- and oxidation-resistant ferritic stainless steel containing aluminum [PB84-189521] N84-30101

SULFUR
Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy [DE84-011458] N84-30028
Improved oxidation sulfidation resistance of Fe-Cr-Ni alloys [DE84-010066] N84-30039

SULFUR DIOXIDES
Intermediate-range grid model and user's guide for atmospheric sulfur dioxide and sulfate concentrations and depositions: Wisconsin Power Plant Impact Study [PB84-189257] N84-30556

SULFUR FLUORIDES
Negative ion formation in SF6 spark by-products [DE84-012340] N84-30212

SULFUR OXIDES
European views on controlling acid rain [PB84-194208] N84-30563

SUN
White light solar corona: An atlas of 1983 K-coronameter synoptic charts [PB84-184159] N84-31075
Fundamental and harmonic emission in interplanetary type 2 radio bursts [NASA-TM-86099] N84-31079

SUNLIGHT
Sunlight probability data for select cities in the US
[DE84-000006] N84-30605
SUNSET
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86265] N84-30566
SUNSPOTS
Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-186697] N84-31078
SUPERCOMPUTERS
Supercomputers: The next ten years. A user's view
[DE84-011072] N84-30727
The S-1 Mark IIA supercomputer
[DE84-012374] N84-30732
Review of NASA's (National Aeronautics and Space Administration) Numerical Aerodynamic Simulation Program
[NASA-CR-173842] N84-30799
SUPERCONDUCTING MAGNETS
Magnetic suspension and balance system study
[NASA-CR-3802] N84-29888
New 1-phase dual converter for superconducting inductive energy storage and transfer applications: The 1-phase inductor-converter bridge
[DE84-012118] N84-30193
Commissioning tests of the Bonneville Power Administration 30 MJ superconducting magnetic energy storage unit
[DE84-006033] N84-30660
SUPERCONDUCTIVITY
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30662
SUPERCONDUCTORS
A 6.5 Tesla SSC lattice example
[DE84-010719] N84-30658
Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer
N84-30665
High-gradient, pulsed operation of superconducting niobium cavities
[DE84-012498] N84-31030
SUPERFLUIDITY
Remarks on thermal analyses of thin 4He films in superfluid heat pipe N84-30121
Experimental study on porous-plug phase separator for superfluid He2
[ISAS-612] N84-31008
SUPERSONIC FLOW
Random-choice solutions for two-dimensional and axisymmetric supersonic flows N84-30115
Visualization for a free jet by a laser induced fluorescence method and its structure N84-30120
Viscous computation of a space shuttle flow field
[NASA-TM-85977] N84-30225
Dust particles in high speed flows: Calculations of small particle reentry hydrodynamics
[DE84-010998] N84-30245
Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30980
SUPERSONIC FLUTTER
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1984-1, 218/ January - February
[ESA-TT-858] N84-29850
SUPPORTS
Ring-type support concept for twisted coils (finite element simulation) — stellarators
[IPP-2/271] N84-30327
SURFACE ACOUSTIC WAVE DEVICES
Propagation loss in electrostatically variable SAW delay lines
[AD-A142433] N84-30183
SURFACE CRACKS
Calculation of crack behaviour on exposure to thermal shock
[BLL-RISLEY-TR-4941-(9091.9F)] N84-30326
The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings
[MRL-R-924] N84-30332
SURFACE DEFECTS
HgCdTe surface and defect study program
[AD-A142342] N84-31010
SURFACE ENERGY
Interfacial interaction and adhesion in composite materials N84-29961
SURFACE FINISHING
Study of mechano-chemical machining of ceramics and the effect on thin film behavior
[AD-A142542] N84-30080
SURFACE LAYERS
Surface layer effects on the mechanical behavior of metals
[AD-A142280] N84-30018
SURFACE NAVIGATION
Panama Canal Fog Navigation Study: Candidate system definition
[PB84-180793] N84-30624
Panama Canal Fog Navigation Study: System requirements statement
[PB84-179811] N84-30625
SURFACE PROPERTIES
Surface disturbances due to trailing vortices
[AD-A142693] N84-30233
SURFACE REACTIONS
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29965
Solving corrosion problems with surface analysis
[DE84-008652] N84-30025
Effects of water-vapor on friction and deformation of polymeric magnetic media in contact with a ceramic oxide
[NASA-TM-83727] N84-30072
The use of isotopically-enriched carbon probes for erosion deposition measurements in the ASDEX divertor
[DE84-012329] N84-31006
Computer simulation studies of sputtering and multimer formation from clean and oxygen reacted surfaces of titanium, vanadium and niobium
[AD-A141998] N84-31009
Solid surface luminescence analysis
[DE84-011254] N84-31022
SURFACE ROUGHNESS
Generalized roughness effects on turbulent boundary layer heat transfer. A discrete element predictive approach for turbulent flow over rough surfaces
[AD-A141943] N84-30227
Optical second-harmonic generation for surface studies
[DE84-010718] N84-30958
SURFACE TEMPERATURE
Soil moisture from temperature measurements at the Earth's surface, update N84-30474
Modification of the surface temperature by an artificial cirrus cloud
[DE84-011387] N84-30611
Interannual variability in sea-surface temperature at one location along the central California coast
[AD-A142553] N84-30632
SURFACE WATER
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
SURFACE WAVES
The breaking of ocean surface waves
[AD-A142356] N84-30629
SURFACTANTS
Flow of foam through porous media
[DE84-012410] N84-30246
SURGERY
A model of the shoulder girdle for use in rehabilitation
N84-30710
Treatment of patients with a lesion of the brachial plexus N84-30712
SURVEYS
Aviation fuels, 1983
[DE84-011823] N84-30106
SURVIVAL
Inference based on ranks with multiple failure time or grouped survival data
[MATHS-RES-177] N84-30324
SWITCHES
An operating system and memory switch for the S-1 computer
[DE84-013094] N84-30731
SWITCHING
Graphics workstation switching unit
[DE84-011626] N84-30788
SWITCHING CIRCUITS
New 1-phase dual converter for superconducting inductive energy storage and transfer applications: The 1-phase inductor-converter bridge
[DE84-012118] N84-30193
SYMBOLS
Automatic symbol generating for topographic maps using raster data processing following the example of the general topographic map 1:200,000 (TUEK 200)
N84-30497
SYMMETRY
A Taylor series in symmetry-adaptable functions
[AD-A142336] N84-30819
Supersymmetric nonlinear sigma models constrained on a noncompact manifold
[PREPRINT-356] N84-30843
Fun with supersymmetric quantum mechanics
[DE84-011329] N84-31031
SYNAPSES
Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678
SYNCHROTRON RADIATION
Exploration of phase stability in the surfatron accelerator
[DE84-011416] N84-30280
SYNCHROTRONS
High-current, low-energy synchrotrons and compressor rings
[DE84-012104] N84-30906
SYNOPTIC METEOROLOGY
Studies of statistical techniques to evaluate weather modification. Volume 1: Reports of OSET
[PB84-182906] N84-30620
Variability of the convection field pattern in South Florida and its relationship to the synoptic flow
[PB84-177393] N84-30623
A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979
[AD-A142548] N84-30631
SYNTAX
Syntax and semantics of a LINCS control monologue
[DE84-011399] N84-30605
SYNTHESIS (CHEMISTRY)
Synthesis of diazidodiesters N84-29956
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets
N84-29963
Macrocycles containing tin. Synthesis and structure of 1,10-Diphenyl-1.10-Distannabicycle (8.8.8)Hexacosane
[AD-A142703] N84-29966
Synthesis and toughness properties of resins and composites N84-29973
Thin film synthesis of superconducting chemical compounds
[AD-A142541] N84-29992
Synthesis of refractory materials
[DE84-011045] N84-30041
Self-propagating high-temperature synthesis of ceramics in vacuum
[AD-A142506] N84-30079
High energy binders
[AD-A142347] N84-30105
Promotion effects on the synthesis of higher alcohols
[DE84-009916] N84-30109
SYNTHETIC APERTURE RADAR
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157
Summary of SAR (Synthetic Aperture Radar) ocean wave data archived at ERIM (Environmental Research Institute of Michigan)
[AD-A142620] N84-30633
SYNTHETIC FUELS
Two-stage process for conversion of synthesis gas to high quality transportation fuels
[DE84-009624] N84-30108
SYSTEM EFFECTIVENESS
Transmission efficiency measurements and correlations with physical characteristics of the lubricant
[NASA-TM-83740] N84-30293
SYSTEMS ANALYSIS
Study of the FAA (Federal Aviation Administration) program to modernize maintenance operations
[AD-A142295] N84-29848
The heat pipe exchanger with controllable heat exchanging area N84-30124
Performance of digital communications over selective fading channels
[AD-A142427] N84-30158
Performance measurement in a distributed processing environment
[AD-A142410] N84-30722
Operating system interface for Ada (trademark) instructors
[AD-P003433] N84-30765
Analysis and control of a class of stiff linear distributed systems
[AD-A142364] N84-30821
A field study of Air Force organization structures
[AD-A142369] N84-31035
SYSTEMS COMPATIBILITY
He-3 cooling systems for space
[NASA-TM-85965] N84-30226
SYSTEMS ENGINEERING
Chemical-hydrogen energy systems
[DE84-012676] N84-30112
Control systems design for linear dynamic systems using simple models: Some case studies. Part 1: The single-input/single-output case
[RR-247-PT-1] N84-30134
LANDSAT-4 system description N84-30361

Multispectral Scanner (MSS) instrument description N84-30362
Thematic Mapper (TM) instrument description N84-30363
Radiometric calibration and processing procedure for reflective bands on LANDSAT-4 protoflight Thematic Mapper N84-30366
An overview of the Thematic Mapper geometric correction system N84-30367

SYSTEMS INTEGRATION
Integrated gas-fired space heating/water heating system with electric air conditioning [PB84-181999] N84-30138
Report on functional design specification for the automated alphanumeric data entry system [AD-A142518] N84-30725

SYSTEMS SIMULATION
Supervisory control: Introduction and theory — industrial plant control N84-30706
A utility plant simulator for control room experiments N84-30708
A simulation technique for checking the circle criterion — linear systems stability [RR-248] N84-30733
Linear structures in bilinear systems [RR-250] N84-30852

SYSTEMS STABILITY
A simulation technique for checking the circle criterion — linear systems stability [RR-248] N84-30733

T

TANKER SHIPS
Summaries of doctorate theses — man machine systems N84-30705

TANTALUM ALLOYS
Experimental research facility for creep-rupture testing of tantalum alloy T-111 [DE84-012030] N84-30036
Tantalum-copper alloy and method for making [DE84-011061] N84-30037

TARGET ACQUISITION
Performance of Beverage antennas at low angles [DE84-011163] N84-30164
Results of laser ranging collocations during 1983 N84-30458

TARGET RECOGNITION
Evaluation of U.S. Coast Guard forward-looking airborne radars [AD-A142417] N84-30156

TARGETS
A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems [AD-A141136] N84-29898
Firebolt derivative/ramjet engine feasibility investigation (core engine program): Program summary N84-29962
Evaluation of U.S. Coast Guard forward-looking airborne radars [AD-A142417] N84-30156
An advanced host-target environment for the military computer family [AD-P003428] N84-30760

TASKS
A problem expending parametric programming method for solving the job shop scheduling problem [AD-A142392] N84-31036

TAYLOR SERIES
A Taylor series in symmetry-adaptable functions [AD-A142336] N84-30819

TDR SATELLITES
Tracking and Data Relay Satellite launch recovery mission N84-29918

TEARING
Impact dynamics research on composite transport structures N84-29975
J-integral tearing instability analysis for 8-inch diameter ASTM A106 steel pipe [AD-A142580] N84-30023

TEARING MODES (PLASMAS)
Nonlinear dynamics of magnetic islands with curvature and pressure [DE84-010968] N84-30859

TECHNICAL WRITING
Air Force Academy Aeronautics Digest [AD-A142399] N84-29849

TECHNOLOGICAL FORECASTING
Program for Regional Observing and Forecasting Services (PROFS) [PB84-179928] N84-30618
New directions in linear accelerators [DE84-011412] N84-30911
Science and technology report to the Congress, 1982 [DE84-901150] N84-31040

TECHNOLOGIES
Technical assistance and information dissemination for the appropriate technology small grants program [DE84-010957] N84-31042

TECHNOLOGY ASSESSMENT
Salyut: Soviet steps toward permanent human presence in space [PB84-181437] N84-29905
Electronics Division research and development [DE84-011024] N84-30200
Initial insights on robotics [DE84-010768] N84-30302
Thematic Mapper (TM) instrument description N84-30363
Thematic Mapper sensor characteristics N84-30365
Photovoltaic concentrators: Present status and future role [DE84-005520] N84-30532
New directions in linear accelerators [DE84-011412] N84-30911
Magnetic fusion energy plasma interactive and high heat flux components. Volume 1: Technical assessment of the critical issues and problem areas in the plasma materials interaction field [DE84-011527] N84-30969
Appropriate Technology Small Grants Program evaluation, volume 1: Executive summary [DE84-010675] N84-31038
Science and technology report to the Congress, 1982 [DE84-901150] N84-31040

TECHNOLOGY TRANSFER
Survey and analysis of materials research and development at selected federal laboratories [DE84-008904] N84-29967
Remote sensing and the private sector: Issues for discussion [PB84-160777] N84-30520
Program for Regional Observing and Forecasting Services (PROFS) [PB84-179928] N84-30618
US technology transfer to China [GPO-29-567] N84-31064

TECHNOLOGY UTILIZATION
The use of space laboratories for materials investigations, process engineering, and scientific purposes N84-29895
Calibration of TM data from ground-based measurements N84-30385
Study of Thematic Mapper and Multispectral Scanner data applications N84-30421
National Weather Service hurricane probability program [PB84-182757] N84-30619

TECTONICS
Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results — Death Valley, California, Cement-Velma, Oklahoma; Big Horn and Wind River Basins, Wyoming; Spanish Peaks, Colorado; and the Four Corners area (Paradox Basin of Utah and Colorado) N84-30412
Research activities of the Geodynamics Branch [NASA-TM-86123] N84-30455
Geodynamics of crustal deformation and seismotectonic block movements in central Europe N84-30460
Geodynamics [NASA-CP-2325] N84-30475
Projection for space geodynamics, 1988-1998 N84-30477
Stratigraphic and volcano-tectonic relations of Crater Flat Tuff and some older volcanic units, Nye County, Nevada [DE84-010926] N84-30584

TELECOMMUNICATION
Locally optimum and suboptimum detector performance in a non-Gaussian interference environment [PB84-184738] N84-30173
Policy implications of information technology [PB84-183219] N84-31060

TELLURIUM COMPOUNDS
HgCdTe surface and defect study program [AD-A142342] N84-31010

TEMPERATURE CONTROL
The heat pipe exchanger with controllable heat exchanging area N84-30124
Simplified method for estimating the cooling loads of passive solar systems [DE84-009474] N84-30538

TEMPERATURE DEPENDENCE
The compatibility of MON-3 and 301 cryoformed stainless steel N84-29924
Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions [AD-A142483] N84-29990
Noncubic magnetic anisotropy in YSmLuCaFeGe garnet films N84-30869
Static frequency-temperature characteristics of doubly rotated quartz [AD-A142456] N84-31013

TEMPERATURE DISTRIBUTION
Prediction of the temperature characteristics in intermittent, free turbulent shear layers [CFD/84/1] N84-30256

TEMPERATURE EFFECTS
A turbomechanical thrust vector control for advanced intercontinental ballistic missiles N84-29953
Creep-fatique and temperature synergisms in alloy 800 [DE84-010131] N84-30046
The effects of solid solution temperatures and cooling rates on the microstructures of BT3-1 titanium alloy N84-30066
The effects of strain rate and temperature on the fracture behavior of three structural adhesives [AD-B084418] N84-30097
The temperature sensitivity of doubly rotated quartz resonators [AD-A142537] N84-30186
EValuation of a 96V EV 1000 battery pack at temperature extremes [PB84-187723] N84-30217
Evaluation of 96V exide EPV23-3 battery pack at temperature extremes [PB84-187749] N84-30218
Evaluation of an 96V ALCO 2200 battery pack at temperature extremes [PB84-187731] N84-30219
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery [PB84-184894] N84-30550
Salinity and temperature effects on photosynthesis and organic carbon release rates by selected benthic macroalgae [PB84-163146] N84-30674
Some scoping experiments for a space reactor [DE84-009101] N84-30941

TEMPERATURE GRADIENTS
Characterization of filament wound Kevlar and glass composites for rocket motor applications N84-29949
Directional growth of pearlite in Fe-C eutectiod alloys [DE84-007368] N84-30042
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions [AD-A142420] N84-30892
Thermoacoustic couple [DE84-011296] N84-30895
Temperature rise calculations for the beam pipe in the SLC arcs [DE84-011764] N84-30924
Nonlocal heat transport by non-Maxwellian electrons [DE84-012391] N84-31000

TEMPERATURE INVERSIONS
Effect of antiscreening of outgoing thermal radiation by cloud cover N84-30490

TEMPERATURE MEASUREMENT
Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests [DE84-012833] N84-30054
Using chemically reactive tracers to determine temperature characteristics of geothermal reservoirs [DE84-011373] N84-30580
Investigation of laminar shocks [DE84-010074] N84-30582
Automated analysis of upper air soundings to specify precipitation type [PB84-174333] N84-30617
Ohmic heating to 100-eV and helicity injection in CTX [DE84-007494] N84-30986

TEMPERATURE PROFILES
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder [NOAA-TM-NESDIS-6] N84-30571

TEMPERING
A study of the tempering transformation of retained austenite in isothermal quenching structures, bainite tempered embrittlement N84-30065

TEMPORAL DISTRIBUTION
Biological oceanography N84-30437
Monthly mean determination of the solar semidiurnal surface pressure oscillation at Batavia from 1866 through 1944 [PB84-184795] N84-30593

TEMPORAL RESOLUTION
In-flight absolute radiometric calibration of the Thematic Mapper N84-30383
LANDSAT scene-to-scene registration accuracy assessment N84-30405
LANDSAT-4 MSS geometric correction: Methods and results N84-30409

TENNESSEE
An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414
TENSILE PROPERTIES
Ring ductility of irradiated Inconel 706 and Nimonic PE16
[DE84-010397] N84-30034
Characterization of block copolymers based on poly(3,3-bis(ethoxymethyl)oxetane) and other novel polyethers
[AD-A142606] N84-30081
TENSILE STRENGTH
Synthesis and toughness properties of resins and composites N84-29973
Tensile strength of composite sheets with unidirectional stringers and crack-like damage N84-29974
A study of stiffness, residual strength and fatigue life relationships for composite laminates
[NASA-CR-172211] N84-29978
Grain-refining heat treatments to improve cryogenic toughness of high-strength steels
[NASA-TM-85816] N84-30014
Influence of processing on the cryogenic mechanical properties of high strength high manganese stainless steel
[DE84-008242] N84-30027
The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings
[MRL-R-924] N84-30332
TENSILE TESTS
Ring ductility of irradiated Inconel 706 and Nimonic PE16
[DE84-010397] N84-30034
Experimental research facility for creep-rupture testing of tantalum alloy T-111
[DE84-012030] N84-30036
TERMINAL BALLISTICS
The penetration model of Dehn — terminal ballistics
[PML-1984-5] N84-30316
TERRAIN
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30892
TERRESTRIAL RADIATION
The Earth's radiation belts
[AD-A142673] N84-30574
TEST CHAMBERS
Explosion parameters of ferroalloy dusts
[BLL-M-35571-(5828.4)] N84-30102
TEST FACILITIES
A survey of biodynamic test devices and methods
[AD-A142467] N84-29694
Flow Induced Vibration Program at Argonne National Laboratory
[DE84-009233] N84-30249
European Space Tribology Laboratory: Facilities, services, capabilities
[ESA-BR-12] N84-30317
TEXTILES
Survey and analysis of materials research and development at selected federal laboratories
[DE84-008904] N84-29967
TEXTURES
Thermomechanical processing and texture development in Ni-Cr-Mo and Mn-Mo-B armor steels
[AD-A142352] N84-30020
THEMATIC MAPPING
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1
[E84-10166] N84-30359
The LANDSAT-4 program: An overview N84-30360
Thematic Mapper (TM) instrument description N84-30363
An overview of LANDSAT-4 and the Thematic Mapper N84-30364
Thematic Mapper sensor characteristics N84-30365
Radiometric calibration and processing procedure for reflective bands on LANDSAT-4 protoflight Thematic Mapper N84-30366
An overview of the Thematic Mapper geometric correction system N84-30367
LANDSAT-4 radiometric and geometric correction and image enhancement results — San Francisco Bay, California N84-30370
A preliminary assessment of LANDSAT-4 Thematic Mapper data N84-30377
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30380
LANDSAT-4 MSS and TM spectral class comparison and coherent noise analysis — The Des Moines, Iowa area N84-30381
TM failed detectors data replacement N84-30382
In-flight absolute radiometric calibration of the Thematic Mapper N84-30383
LANDSAT-4 Thematic Mapper calibration and atmospheric correction N84-30384
Calibration of TM data from ground-based measurements N84-30385
Scan-angle and detector effects in Thematic Mapper radiometry N84-30386
Thematic Mapper spectral dimensionality and data structure N84-30387
MTF analysis of LANDSAT-4 Thematic Mapper N84-30388
Intraband radiometric performance of the LANDSAT-4 Thematic Mapper N84-30389
Analysis of LANDSAT-4 TM data for lithologic and image mapping purpose N84-30390
Status of the ESA-Earthnet LANDSAT-4 TM ground processing chain N84-30391
An analysis LANDSAT-4 Thematic Mapper geometric properties N84-30392
The use of linear feature detection to investigate Thematic Mapper data performance and processing N84-30393
Spatial resolution estimation of LANDSAT-4 TM data N84-30394
An analysis of the high frequency vibrations in early Thematic Mapper scenes N84-30395
Assessment of Thematic Mapper band-to-band registration by the block correlation method N84-30396
LANDSAT scene-to-scene registration accuracy assessment N84-30405
Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413
An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416
A concept for the processing and display of Thematic Mapper data N84-30417
A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425
The effect of spatial, spectral and radiometric factors on classification accuracy using thematic mapper data
[NASA-TM-85995] N84-30510
THEORETICAL PHYSICS
Indiana University Theoretical Particle Physics Group
[DE84-010593] N84-30903
THERMAL ANALYSIS
Remarks on thermal analyses of thin 4He films in superfluid heat pipe N84-30121
THERMAL BATTERIES
Quality control analysis of TA-23 glass seals for lithium ambient temperature batteries
[DE84-011719] N84-30094
THERMAL CONDUCTIVITY
Research and development of long heat pipes and their applications — heating road surfaces on bridges N84-30126
Manipulator having thermally conductive rotary joint for transferring heat from a test specimen
[DE84-010958] N84-30242
A convective mechanism for inhibition of heat conduction in laser produced plasmas
[DE84-011336] N84-30289
THERMAL DECOMPOSITION
Combustion of GAP, part 1 N84-29952
Kevlar-49/epoxy case skirt structural fatigue strength N84-29955
A study of the tempering transformation of retained austenite in isothermal quenching structures, bainite tempered embrittlement N84-30065
THERMAL DEGRADATION
Determination of thermal-degradation rates of some candidate Rankine-cycle organic working fluids for conversion of industrial waste heat into power
[DE84-009585] N84-30304
THERMAL EMISSION
Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069
THERMAL FATIGUE
Calculation of crack behaviour on exposure to thermal shock
[BLL-RISLEY-TR-4941-(9091.9F)] N84-30326
THERMAL NEUTRONS
Defect production efficiencies in thermal neutron irradiated copper and molybdenum
[DE84-010993] N84-31018
THERMAL RADIATION
Effect of antiscreening of outgoing thermal radiation by cloud cover N84-30490
THERMAL RESOURCES
Thermal ground water flow systems in the thrust zone in southeastern Idaho
[DE84-011598] N84-30517
Economics of a conceptual 75 MW hot dry rock geothermal electric power station
[DE83-015926] N84-30539
THERMAL SHOCK
Calculation of crack behaviour on exposure to thermal shock
[BLL-RISLEY-TR-4941-(9091.9F)] N84-30326
THERMAL STRESSES
Support structures for large infrared telescopes
[NASA-CR-3800] N84-30328
THERMITES
Integral low-energy thermite igniter
[DE84-011082] N84-29999
THERMOCHEMISTRY
Performance verification tests of an uprated augmented catalytic thruster N84-29911
Engineering scoping study of the production of hydrogen and oxygen from the cerium oxide-sodium phosphate/carbonate thermochemical cycle
[DE84-010629] N84-29998
THERMOCOUPLES
Use of Peltier effect for small signal amplification and conversion N84-30664
THERMODYNAMIC EQUILIBRIUM
The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985
THERMODYNAMIC PROPERTIES
A tractable theory for nonlinear propellant response and cumulative damage predictions N84-29950
Self-propagating high-temperature synthesis of ceramics in vacuum
[AD-A142506] N84-30079
Guidelines for running the thermal computational model of the eye
[AD-A142550] N84-30688
THERMODYNAMICS
Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557
USSR report: Physics and mathematics
[JPRS-UPM-84-001] N84-30862
Propagation of acoustic waves in partially saturated porous media
[DE84-010536] N84-30896
THERMOELECTRIC GENERATORS
APL/JHU free flight tests of the general purpose heat source module. Testing: 5-7 March 1984
[DE84-011065] N84-30948
THERMONUCLEAR REACTIONS
Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30881
THERMOPILES
Thermoacoustic couple
[DE84-011296] N84-30895
THERMOPLASTIC RESINS
Rapid adhesive bonding concepts
[NASA-TM-86256] N84-29968
Crystalline-state extrusion of low density polyethylenes
[AD-A142017] N84-30075
Fluorothermoplastics for long life, weatherproof composites
[BMFT-FB-T-84-082] N84-30096
THERMOSETTING RESINS
Characterization of filament wound Kevlar and glass composites for rocket motor applications N84-29949
Rapid adhesive bonding concepts
[NASA-TM-86256] N84-29968
THERMOSIPHONS
A blowup phenomenon of the working fluid in a two-phase closed thermosyphon N84-30122
Research and development of long heat pipes and their applications — heating road surfaces on bridges N84-30126
THERMOSPHERE
Quasi-two-day variation of lower thermosphere wind velocities N84-30488
THERMOVISCOELASTICITY
Computational method for thermoviscoelasticity with application to rock mechanics
[DE84-003087] N84-305
THETA PINCH
Studies of CO2 laser interactions with plasma
[DE84-012485] N84-31004
THICKENERS (MATERIALS)
Thickener/fluid interaction in lubricating greases
[AD-A142276] N84-30076
THIN FILMS
Study of mechano-chemical machining of ceramics and the effect on thin film behavior
[AD-A142542] N84-30080

Remarks on thermal analyses of thin 4He films in superfluid heat pipe N84-30121
Characterization of micron-sized, optical coating defects by photothermal deflection microscopy [DE84-011150] N84-30960
Energy-resolving carbon resistance probes for plasma edge characterization [DE84-012235] N84-30997
Electrochromic materials for the regulation of solar energy transmission through windows [DE84-012165] N84-31029

THIN WALLED SHELLS
Formulation of stiffness matrices for elastic buckling of thin-walled open section prismatic columns [TT-8402] N84-30353

THOMSON SCATTERING
Space resolved absolutely calibrated VUV spectroscopic measurements on CTX [DE84-007490] N84-30984
Confinement time and energy balance in the CTX spheromak [DE84-007491] N84-30987
Studies of CO2 laser interactions with plasma [DE84-012465] N84-31004

THREE BODY PROBLEM
Qualitative study of the planer isosceles three-body problem [PREPRINT-35] N84-29696

THREE DIMENSIONAL FLOW
Elliptic grid generation for three-dimensional geometries N84-30117
An integral prediction method for three-dimensional flow separation [AD-A142551] N84-30231

THRUST
Thrust level requirements for space station on-orbit propulsion N84-29935

THRUST AUGMENTATION
Thrust augmentation study of high performance ejectors [AD-A142650] N84-29856
Performance verification tests of an uprated augmented catalytic thruster N84-29911
MPD thruster comparisons with advanced chemical systems for auxiliary propulsion applications N84-29926
Thrust balance efficiency measurements for a pulsed inductive thruster N84-29930

THRUST CHAMBERS
Very low thrust and low chamber pressure GO2/GH2 thruster technology N84-29910
Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934

THRUST CONTROL
The space transportation system reaction control system and orbital maneuvering subsystem N84-29908
Iron nitrate and MON-3 nitrogen tetroxide N84-29909
Very low thrust and low chamber pressure GO2/GH2 thruster technology N84-29910
Tracking and Data Relay Satellite launch recovery mission N84-29918

THRUST VECTOR CONTROL
Fluidic thrust vector control thruster development N84-29940
A turbomechanical thrust vector control for advanced intercontinental ballistic missiles N84-29953

TIDAL WAVES
Proceedings of Tsunami Symposium [PB84-183482] N84-30638

TIDES
An objective analysis technique for extrapolating tidal fields N84-30471
Documentation of wave-height and tidal analysis programs for automated data acquisition and control systems [AD-A142679] N84-30634
Long-term salinity, temperature and current measurements in upper Chesapeake Bay [PB84-180280] N84-30636

TILTMETERS
Omnidirectional fiber optic tiltmeter [DE84-011109] N84-30959

TIMBER IDENTIFICATION
An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414

TIME DEPENDENCE
Electron beam diagnostic for the Los Alamos free electron laser oscillator experiment [DE84-011348] N84-30278
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model [NASA-TM-86265] N84-30566
Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678
RFQ radial matching sections and fringe fields [DE84-011408] N84-30920
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma [IPPJ-674] N84-30966
White light solar corona: An atlas of 1983 K-coronameter synoptic charts [PB84-184159] N84-31075

TIME RESPONSE
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane [NASA-TM-85900] N84-29679

TIME SERIES ANALYSIS
Earth Observing System, conclusions and recommendations N84-30454

TIN COMPOUNDS
Macrocycles containing tin. Synthesis and structure of 1,10-Diphenyl-1,10-Distannabicycle (8.8.8)Hexacosane [AD-A142703] N84-29966

TISSUES (BIOLOGY)
Ultrasonography of canine soft tissues during decompression N84-30653

TITANIUM ALLOYS
Stress-corrosion crack-growth study of titanium alloy Ti-6Al-4V exposed to Freon PCA and nitrogen tetroxide MON-1 N84-29923
Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti [DE84-005411] N84-30043
The effects of solid solution temperatures and cooling rates on the microstructures of BT3-1 titanium alloy N84-30066

TOKAMAK DEVICES
Transmutation of manganese: Substituted steels in STARFIRE [DE84-010402] N84-30035
Plasma in diverter during intense recycling N84-30877
Liquid metal breeder-coolant blanket concept [DE84-006554] N84-30971
Generalized Poisson brackets and nonlinear Liapunov stability: Application to reduced MHD [DE84-009973] N84-30972
The 3-D MHD stability of high-beta free-boundary Tokamak plasmas with finite edge-pressure-gradient and limiter stabilization [DE84-009168] N84-30976
Linear theory of lower hybrid heating [DE84-010577] N84-30979
Lower hybrid experiments at the 1 MW level on Alcator C: Heating and current drive [DE84-010586] N84-30981
Realistic modelling of lower hybrid current drive with multiple codes [DE84-010576] N84-30982
Plasma Fusion Center technical research programs [DE84-007954] N84-30983
Density variation due to wave heating in Tokamak plasmas [DE84-009402] N84-30993
Rotation and impurity transport in a Tokamak plasma with directed neutral beam injection [DE84-008014] N84-30996
Experimental observation of the shear Alfven resonance in a Tokamak [DE84-012993] N84-30998
The use of isotopically-enriched carbon probes for erosion deposition measurements in the ASDEX divertor [DE84-012329] N84-31006

TOLERANCES (PHYSIOLOGY)
Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654
Exchange of gases and physical work capacity in natives of different geographic regions N84-30656

TOLUENE
Determination of thermal-degradation rates of some candidate Rankine-cycle organic working fluids for conversion of industrial waste heat into power [DE84-009585] N84-30304

TOMOGRAPHY
The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar [AD-A142421] N84-30157

TOPOGRAPHY
Research activities of the Geodynamics Branch [NASA-TM-86123] N84-30455
Reports on cartography and geodesy. Series 1: Original reports, number 92 [ISSN-0469-4236] N84-30495
Automatic symbol generating for topographic maps using raster data processing following the example of the general topographic map 1:200,000 (TUEK 200) N84-30497
Automation assisted gathering, processing, and representation of topographic data for the production of the German basic map 1:5000 - height in Lower Saxony N84-30500
Forest generalization by digital raster data processing N84-30501
Cooperative line extraction of aerial photos and maps N84-30502
An example of computer aided generalization of TK 25 — topographical map 1:25,000 (TK 25) N84-30504
An investigation of the reproduction of the general topographic map 1:200,000 in shortened scale with a digital raster data processing system N84-30505
The automated cadastral plan, a source for the topographic country map works N84-30506
Some physical concepts in complex terrain meteorology derived from the Department of Energy's ASCOT program [DE84-010059] N84-30607
Continental shelf processes affecting the oceanography of the South Atlantic Bight [DE84-010113] N84-30635

TOPOLOGY
Suggestion for a cartographic pattern recognition system using digital raster data processing methods N84-30509

TORNADOES
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites [DE84-011157] N84-30608

TOROIDAL PLASMAS
Equilibrium and stability of the Los Alamos spheromak [DE84-010064] N84-30975
The 3-D MHD stability of high-beta free-boundary Tokamak plasmas with finite edge-pressure-gradient and limiter stabilization [DE84-009168] N84-30976
Steady state compact toroidal plasma production [DE84-011090] N84-30977
Theoretical studies of Elma Bumpy Torus (EBT) [DE84-010614] N84-30978
Linear theory of lower hybrid heating [DE84-010577] N84-30979
Realistic modelling of lower hybrid current drive with multiple codes [DE84-010576] N84-30982
Plasma Fusion Center technical research programs [DE84-007954] N84-30983
Confinement time and energy balance in the CTX spheromak [DE84-007491] N84-30987
Magnetohydrodynamic equilibrium and stability of stellarators [DE84-010731] N84-30994

TOROIDS
Galvanic corrosion of an aluminum O-ring [DE84-011345] N84-30047

TORQUE MOTORS
Parallelism in manipulator dynamics. Revision [AD-A142515] N84-30299

TOUGHNESS
Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972
Synthesis and toughness properties of resins and composites N84-29973
Grain-refining heat treatments to improve cryogenic toughness of high-strength steels [NASA-TM-85816] N84-30014

TOWERS
Resonance in the water circuit of a cooling tower [S/T-REPT-VOL-1-NO-2] N84-30254
Wave force investigations at the second Christchurch Bay Tower [NMI-R177] N84-30626
Bond graph time simulations using extracted modal parameters from the Nova spaceframe [DE84-010918] N84-30779

TOXIC HAZARDS
Evaluation of sampling methods for gaseous atmospheric samples [PB84-190735] N84-30012
The evaporation and gaseous dispersion of large-scale releases of nitrogen tetroxide [AD-A142079] N84-30104
Partitioning of toxic trace metals between solid and liquid phases in the Great Lakes [PB84-177849] N84-30525
Use of sperm enzymes to detect genotoxic agents [AD-A142724] N84-30691

TOXICITY
Organophosphate toxicity: Genetics, receptors, and antidotes
[AD-A141059] N84-30685
The toxicity of petroleum and shale JP5
[AD-A142670] N84-30690
TRACE CONTAMINANTS
Partitioning of toxic trace metals between solid and liquid phases in the Great Lakes
[PB84-177849] N84-30525
TRACE ELEMENTS
Trace analysis in quartz
[AD-A142425] N84-29988
TRACKING (POSITION)
A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems
[AD-A141136] N84-29888
TRACKING FILTERS
A high-resolution target-tracking concept using spectral estimation techniques
[AD-A141921] N84-30149
TRAINING ANALYSIS
The US Army model Ada (trademark) training curriculum
[AD-P003415] N84-30747
Teaching Ada (trademark) at Hampton Institute
[AD-P003420] N84-30752
Teach Ada (trademark) as the student's first programming language?
[AD-P003422] N84-30754
TRAINING DEVICES
The Army Ada (trademark) education program
[AD-P003414] N84-30746
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers exercise guide
[AD-A142429] N84-30767
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers' guide: Volume 1
[AD-A142430] N84-30768
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers guide: Volume 2
[AD-A142431] N84-30769
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers guide
[AD-A142432] N84-30770
TRAINING SIMULATORS
A review of the literature on training simulators. Translators: Transfer of training and simulator fidelity
[AD-A142732] N84-30700
TRAJECTORIES
STS-13 (41-C) BET products
[NASA-CR-172350] N84-29901
Proton-induced single event upsets in 71 Earth-satellite environments
[AD-A142435] N84-30771
Spinorial relativistic rotator: The transformation from quasi-Newtonian to Minokowski coordinates
[DE84-009091] N84-30839
TRAJECTORY CONTROL
Propulsion in a life-saving role for ACES 2
N84-29942
TRANSDUCERS
Elastic domain wall waves in ferroelectric ceramics and single crystals
[AD-A142393] N84-31011
TRANSFER OF TRAINING
A review of the literature on training simulators. Translators: Transfer of training and simulator fidelity
[AD-A142732] N84-30700
The CECOM summer faculty research program
[AD-P003421] N84-30753
TRANSFERRING
The transfer of atoms, ions and molecular groups in solution. Part 2: Tunnelling between harmonic walls
[AD-A142334] N84-29982
The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983
TRANSFORMATIONS (MATHEMATICS)
Modifications to iterative recursion unfolding algorithms and computer codes to find more appropriate neutron spectra
[AD-A142475] N84-30775
Spinorial relativistic rotator: The transformation from quasi-Newtonian to Minokowski coordinates
[DE84-009091] N84-30839
TRANSIENT RESPONSE
Transient response of GaAs microwave power FET to X-ray pulses
[DE84-010145] N84-31017
TRANSITION METALS
Solvent, ligand, and ionic charge effects on reaction entropies for simple transition-metal redox couples
[AD-A142374] N84-29984
TRANSITION TEMPERATURE
Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests
[DE84-012833] N84-30054
TRANSLATIONAL MOTION
Seismic response for multicomponent earthquakes
[PB84-193747] N84-30354
TRANSMISSIONS (MACHINE ELEMENTS)
Transmission efficiency measurements and correlations with physical characteristics of the lubricant
[NASA-TM-83740] N84-30293
Summary of drive-train component technology in helicopters
[NASA-TM-83726] N84-30294
TRANSMITTANCE
The DFVLR contrast transmittance model SCOTRAN-program system: Description and operating instruction
[DFVLR-FB-84-18] N84-30589
Electro-optical transmission and liquid water content of fogs and clouds
[AD-A142294] N84-30597
TRANSMUTATION
Transmutation of manganese: Substituted steels in STARFIRE
[DE84-010402] N84-30035
TRANSONIC FLOW
Acceleration to a steady state for the Euler equations
[NASA-CR-172398] N84-29852
TRANSONIC WIND TUNNELS
Half-model testing in the NLR high speed wind tunnel (HST)
[NLR-TR-82123-U] N84-29891
Description and validation of the two dimensional test setup for multiple airfoils in the pressurized wind tunnel HST
[NLR-TR-83031-U] N84-29892
TRANSPIRATION
Desert emergency - lack of water - how to find and collect water. Plants and human survival in the desert
[AD-A142025] N84-30513
TRANSPORT AIRCRAFT
Energy efficient engine program contributions to aircraft fuel conservation
[NASA-TM-83741] N84-29876
TRANSPORT PROPERTIES
Transport properties of concentrated solutions
[DE84-008495] N84-30210
Application of molecular dynamics to macroscopic particles
[DE84-011066] N84-30244
International Workshop on Biophysical Correlates of Cellular Function UNESCO
[AD-A142490] N84-30671
Temperature rise calculations for the beam pipe in the SLC arcs
[DE84-011764] N84-30924
Transverse field focused system
[DE84-011070] N84-30942
Cation self-diffusion in Fe2O3
[DE84-009152] N84-31025
TRANSPORT THEORY
Transport properties of concentrated solutions
[DE84-008495] N84-30210
Application of molecular dynamics to macroscopic particles
[DE84-011066] N84-30244
The Earth's radiation belts
[AD-A142673] N84-30574
Applied mathematics of transport theory
[DE84-011498] N84-30838
Rotation and impurity transport in a Tokamak plasma with directed neutral beam injection
[DE84-008014] N84-30996
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010842] N84-30999
TRANSPORTATION ENERGY
Two-stage process for conversion of synthesis gas to high quality transportation fuels
[DE84-009624] N84-30108
TRANSVERSE WAVES
Numerical simulations of the structure and propagation of self-sustained detonations
[AD-A142486] N84-30230
TREES (MATHEMATICS)
Human reliability analysis using event trees
[S/T-REPT-VOL-1-NO-3] N84-30718
TRIANGLES
Qualitative study of the planar isosceles three-body problem
[PREPRINT-35] N84-29896
TRIAXIAL STRESSES
Method for defining the distribution of triaxial stress states in underground structures
[DE84-010591] N84-30342
TRIBOLOGY
European Space Tribology Laboratory: Facilities, services, capabilities
[ESA-BR-12] N84-30317
TRIGGER CIRCUITS
UV laser triggering of crowbars used in the Sandia lightning simulator
[DE84-009084] N84-30199
TRITIUM
Calculation of molecular final states and their effect on a precision neutrino mass experiment
[DE84-011071] N84-30921
TROPICAL STORMS
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596
TROPOSPHERE
Tropospheric chemistry N84-30441
Tropospheric science N84-30447
TRUCKS
Operation and calibration of the Wincharger 450 model SWECS
[DE84-009757] N84-30546
Scope for active noise abatement in vehicle diesel engines
[BLL-M-28767-(5825.4)] N84-30885
TRUSSES
Support structures for large infrared telescopes
[NASA-CR-3800] N84-30328
TRYPTOPHAN
Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680
TSUNAMI WAVES
Developments of research on prediction of earthquakes, tsunami and volcanic eruptions in Far East N84-30485
Proceedings of Tsunami Symposium
[PB84-183482] N84-30638
TUBES
Upset weld study for joining 304L stainless steel tubes
[DE84-011507] N84-30313
TUNING
Practical aspects of tuning a ringed RFQ
[DE84-011366] N84-30163
TURBOCOMPRESSORS
PURDU-WINCOF: A computer code for establishing the performance of a fan-compressor unit with water ingestion
[NASA-CR-168005] N84-29875
TURBOFAN ENGINES
Energy efficient engine program contributions to aircraft fuel conservation
[NASA-TM-83741] N84-29876
TURBOMACHINERY
A turbomechanical thrust vector control for advanced intercontinental ballistic missiles N84-29953
TURBOPROP AIRCRAFT
Active attenuation of propeller blade passage noise
[NASA-CR-172386] N84-30886
TURBOPROP ENGINES
Fuel savings potential of the NASA Advanced Turboprop Program
[NASA-TM-83736] N84-29878
TURBULENCE
Analysis of airfoil transitional separation bubbles
[NASA-CR-3791] N84-29854
A method for three-dimensional modeling of wind-shear environments for flight simulator applications
[NASA-TM-85969] N84-29857
Vortex methods and turbulent cnmbustion
[DE84-011874] N84-30004
TURBULENT BOUNDARY LAYER
Interference drag in a simulated wing-fuselage juncture
[NASA-CR-3811] N84-29853
Numerical analysis of the burst in the turbulent boundary layer, based on the three-dimensional ortex model
N84-30116
Calculation of the statistical characteristics of surface
[NASA-TM-77462] N84-30222
Generalized roughness effects on turbulent boundary layer heat transfer. A discrete element predictive approach for turbulent flow over rough surfaces
[AD-A141943] N84-30227
Effect of turbulent boundary layer flow on measurement of acoustic pressure and intensity, revised
[AD-A142473] N84-30229

TURBULENT FLOW
La Recherche Aerospatiale, Bimonthly Bulletin, no. 1984-1, 218/ January - February
[ESA-TT-856] N84-29850
Generalized roughness effects on turbulent boundary layer heat transfer. A discrete element predictive approach for turbulent flow over rough surfaces
[AD-A141943] N84-30227
An integral prediction method for three-dimensional flow separation
[AD-A142551] N84-30231
Optimization of a numerical method to calculate elliptic flows
[DFVLR-FB-84-16] N84-30252
Progress in the development of an intermittency model of turbulence
[CFD/83/7] N84-30255
Prediction of the temperature characteristics in intermittent, free turbulent shear layers
[CFD/84/1] N84-30256

TURBULENT WAKES
Vortex methods and turbulent combustion
[DE84-011674] N84-30004

TURNAROUND (STS)
SSME modifications for on-demand launch vehicles
N84-29914

TWO DIMENSIONAL FLOW
Description and validation of the two dimensional test setup for multiple airfoils in the pressurized wind tunnel HST
[NLR-TR-83031-U] N84-29892
Random-choice solutions for two-dimensional and axisymmetric supersonic flows N84-30115

TWO PHASE FLOW
A blowup phenomenon of the working fluid in a two-phase closed thermosyphon N84-30122
Numerical treatment of pipe boundary conditions in two-phase flow
[DE84-006553] N84-30236

TYPEWRITERS
Communication aids for the handicapped N84-30715

U

U.S.S.R.
USSR report: Earth sciences
[JPRS-UES-84-006] N84-30479

U.S.S.R. SPACE PROGRAM
Salyut: Soviet steps toward permanent human presence in space
[PB84-181437] N84-29905

ULLAGE
Shuttle orbiter main propulsion system hardware development and certification for flight N84-29907

ULTRASONIC TESTS
Adhesive bond and composite strength screening system developmental study
[FZM-7184] N84-30073
Qualifications of ultrasonic testing for nuclear inservice inspection applications
[DE84-011699] N84-30323
Method and apparatus for measuring stress
[DE84-011035] N84-30347
Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652
Ultrasonography of canine soft tissues during decompression N84-30653

ULTRASONIC WAVE TRANSDUCERS
Residual stress measurements using shear-horizontal waves from electromagnetic acoustic transducers
[PB84-190636] N84-30171
A theory for cross-coupling in ultrasonic transducer arrays
[DE84-010327] N84-30259

ULTRASONICS
Active ultrasonic cross-correlation flowmeters for mixed-phase pipe flows
[DE84-006449] N84-30260
Biasing and fast degaussing circuit for magnetic materials
[DE84-011261] N84-30657

ULTRAVIOLET ABSORPTION
Ultraviolet light absorbers having 2 different chromophors in the same molecule
[DE84-011279] N84-30000

ULTRAVIOLET ASTRONOMY
Activities in astronomy
[ISSN-0531-4496] N84-31067

ULTRAVIOLET LASERS
UV laser triggering of crowbars used in the Sandia lightning simulator
[DE84-009064] N84-30199

ULTRAVIOLET RADIATION
Resonance ionization spectroscopy of argon, krypton and xenon using vacuum ultraviolet light
[DE84-011655] N84-30006
A program to improve solar blind UV (ultraviolet) flash lamps
[AD-A141909] N84-30177
Holographic interferometry using 20-picosecond UV pulses to obtain time resolved hydro measurements of selenium and gold plasmas
[DE84-009485] N84-30269
Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680
Operation and maintenance of selected ozone and ultraviolet disinfection systems
[PB84-180124] N84-30719
The NOAA-ERL-ARL solar UV radiation and climate research project program description
[PB84-183292] N84-31070

UNDERGROUND EXPLOSIONS
Common data base experiment: Detection and location capacity
[FOA-C-20536-T1] N84-31058

UNDERGROUND STORAGE
Role of trench caps in the shallow land burial of low level wastes
[DE84-011824] N84-30944
Ambient temperature testing of the G-tunnel heated block
[DE84-006927] N84-30945

UNDERGROUND STRUCTURES
Method for defining the distribution of triaxial stress states in underground structures
[DE84-010501] N84-30342

UNDERGROUND TRANSMISSION LINES
Study of latent heat storage system used heat pipes for cooling of underground cables N84-30127

UNDERWATER ACOUSTICS
Analytical modeling of random thermal fluctuations in the NORDA (Naval Ocean Research and Development Activity) high-frequency sound scattering facility
[AD-A142520] N84-30630
Undersea acoustic research
[AD-A142339] N84-30691
On measuring the acoustic intensity of hydroacoustic sources
[AD-A142484] N84-30693

UNDERWATER RESOURCES
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 1: Executive summary
[PB84-187939] N84-30639

UNITED STATES
Advanced battery development in the US
[DE84-010505] N84-30190
Sunlight probability data for select cities in the US
[DE84-000006] N84-30605
US technology transfer to China
[GPO-29-567] N84-31064

UNIVERSITIES
The CECOM summer faculty research program
[AD-P003421] N84-30753
Research activities. Part 1: Statements
[ISBN-3-7983-0959-0] N84-31082

UPGRADING
Status of the ESA-Earthnet LANDSAT-4 TM ground processing chain N84-30391

USER MANUALS (COMPUTER PROGRAMS)
A simulation program with latency exploitation for the transient analysis of digital circuits
[AD-A142377] N84-30181
A users manual for the laser welding code WELD2D
[DE84-011167] N84-30306
Intermediate-range grid model and user's guide for atmospheric sulfur dioxide and sulfate concentrations and depositions: Wisconsin Power Plant Impact Study
[PB84-189257] N84-30556
Network repair level analysis model user's guide
[AD-A141991] N84-30743
Linear systems analysis program user's manual, version 2.2 (VAX/VMS)
[DE84-012230] N84-30789

V

VACUUM
Resonance ionization spectroscopy of argon, krypton and xenon using vacuum ultraviolet light
[DE84-011655] N84-30006

VACUUM CHAMBERS
Manipulator having thermally conductive rotary joint for transferring heat from a test specimen
[DE84-010958] N84-30242

VACUUM TUBES
Rigid indented cylindrical cathode for X-ray tube
[DE84-011093] N84-30204

VALENCE
Photoemission studies of mixed valent systems
[DE84-010797] N84-31020

VAPOR DEPOSITION
Method and apparatus for producing high purity silicon
[DE84-011087] N84-30090
Chemical vapor deposition of amorphous semiconductor films
[DE84-004489] N84-31026

VAPORS
Vapor spill pipe monitor
[DE84-011103] N84-30267

VARIABILITY
Variability of the convection field pattern in South Florida and its relationship to the synoptic flow
[PB84-177393] N84-30623

VARIATIONAL PRINCIPLES
A variational formulation for dissipative maps
[REPT-81] N84-30846

VARIATIONS
The NOAA-ERL-ARL solar UV radiation and climate research project program description
[PB84-183292] N84-31070

VASCULAR SYSTEM
Increase in whole-body peripheral vascular resistance during three hours of air or oxygen prebreathing
[NASA-TM-58261] N84-30684

VASOCONSTRICTION
Increase in whole-body peripheral vascular resistance during three hours of air or oxygen prebreathing
[NASA-TM-58261] N84-30684

VECTORS (MATHEMATICS)
Singular value decomposition with systolic arrays
[NASA-CR-172396] N84-30617

VEGETATION
Delineation of wetland boundaries using vegetation within the Altamaha River Basin of Georgia
[AD-A142590] N84-30515
Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada
[DE84-009032] N84-30610

VEINS
Nomogram for demonstrating change in central venous and pulmonary artery pressure during decompression of different parts of the body N84-30660

VELOCITY DISTRIBUTION
Non-inertial flow of dilute polymer solutions in a sudden contraction
[BLL-WH-558-(909A.9F)] N84-30221
Long-term salinity, temperature and current measurements in upper Chesapeake Bay
[PB84-180280] N84-30636

VENTILATION
Simplified method for estimating the cooling loads of passive solar systems
[DE84-009474] N84-30538

VERTEBRAL COLUMN
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868

VERTEBRATES
Vertebrate behavior and ecology
[DE84-007318] N84-30673

VERTICAL DISTRIBUTION
Trace constituants measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565
Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86285] N84-30566

VERY HIGH FREQUENCIES
First observations of 140 MHz plasma line backscatter during healthy experiments at Tromsoe
[UIO-SR-84-02] N84-30588

VERY LARGE SCALE INTEGRATION
Research in VLSI (Very Large Scale Integration) systems
[AD-A142511] N84-30185
Parallelism in manipulator dynamics. Revision
[AD-A142515] N84-30299
A minimum area VLSI (Very Large Scale Integrated) architecture for O(logn) time sorting
[AD-A142414] N84-30723
Current research in parallel microprocessing systems at Los Alamos
[DE84-011342] N84-30804

VERY LONG BASE INTERFEROMETRY
A comparison between Lageos laser ranging and VLBI determined baselines N84-30459
Recommended program activities, 1988-1998
N84-30478

VESSELS

Invention of a tunable damper for use with an acoustic waveguide in hostile environments [DE84-013109] N84-30897

VIBRATION

Inversion of spectral lineshapes to yield collisional rate constants [AD-A142661] N84-29994

Flow induced Vibration Program at Argonne National Laboratory [DE84-009233] N84-30249

Support structures for large infrared telescopes [NASA-CR-3800] N84-30328

Improved methods of vibration analysis of pretwisted, airfoil blades [NASA-TM-83735] N84-30329

Vibrational studies of the structure of disordered solids [AD-A142297] N84-30338

Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884

VIBRATION DAMPING

Design of a candidate flutter suppression control law for DAST ARW-2 [NASA-TM-86257] N84-29883

VIBRATION EFFECTS

Recommendations for on-site vibration standards [DE84-011756] N84-30207

An analysis of the high frequency vibrations in early Thematic Mapper scenes N84-30395

VIBRATION ISOLATORS

Recommendations for on-site vibration standards [DE84-011756] N84-30207

VIBRATIONAL SPECTRA

The transfer of atoms, ions and molecular groups in solution. Part 2: Tunnelling between harmonic wells [AD-A142334] N84-29982

Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaamminecosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands [AD-A142418] N84-29987

VIDEO EQUIPMENT

A system for automatic digitization of cartographic line drawings N84-30506

VIDEO SIGNALS

Filtering of the colour-difference signals in 4:2:2 YUV digital video coding systems [BBC-RD-1984/4] N84-30141

VISCOELASTICITY

Nonlinear structural characterization of solid propellants N84-29951

Characterization of block copolymers based on poly(3,3 -bis(ethoxymethyl)oxetane) and other novel polyethers [AD-A142606] N84-30081

VISCOMETERS

Helical screw viscometer [DE84-011111] N84-30261

Rotational viscometer for high-pressure, high-temperature fluids [DE84-011094] N84-30264

VISCOSITY

High-temperature lubricants for minimum-cooled diesel engines [AD-A142426] N84-30078

Study of ebullated bed fluid dynamics [DE84-010230] N84-30251

VISCOUS FLOW

Viscous computation of a space shuttle flow field [NASA-TM-85977] N84-30225

Inertial and shear flow N84-30874

VISION

Computational experiments with a feature based stereo algorithm [AD-A142549] N84-30687

VISUAL FLIGHT

Simulator evaluation of a remotely piloted vehicle lateral landing task using a visual display [NASA-TM-85903] N84-29885

VISUAL PERCEPTION

Horizontal diplopia thresholds for head-up displays [AD-A141965] N84-29872

VITAMINS

Use of vitamins during adaptation to high altitudes N84-30843

VITREOUS MATERIALS

Impact of weak electric field on photoconductivity of modified vitreous As2Se3 N84-30867

VOICE

Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation [AD-A142554] N84-30160

VOICE COMMUNICATION

Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation [AD-A142554] N84-30160

VOIDS

Void-particulate director [DE84-011300] N84-30262

VOLATILITY

Definition of the concentration gradient above flammable liquids [DE84-008296] N84-29996

VOLCANOES

Inevitable climatic changes N84-30480

Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys [DE84-012547] N84-30519

In-stream distribution and hydraulic and ecological effects of volcanic ash from Mount St. Helens eruption [PB84-169382] N84-30526

VOLCANOLOGY

Developments of research on prediction of earthquakes, tsunami and volcanic eruptions in Far East N84-30485

Stratigraphic and volcano-tectonic relations of Crater Flat Tuff and some older volcanic units, Nye County, Nevada [DE84-010926] N84-30584

VOLUMETRIC STRAIN

Comparison of methods for calculating energy release rates [DE84-012231] N84-30350

VORTEX GENERATORS

Surface disturbances due to trailing vortices [AD-A142693] N84-30233

VORTICES

Numerical analysis of the burst in the turbulent boundary layer, based on the three-dimensional ortex model N84-30116

Numerical simulation of autorotation N84-30118

Surface disturbances due to trailing vortices [AD-A142693] N84-30233

VORTICITY

Heat transfer and oil flow studies on a single-stage-to-orbit control-configured winged entry vehicle [NASA-TM-85833] N84-29897

Modified 5-point and 9-point schemes for the solution of the Vorticity- transport equation with cross derivatives [AD-A142720] N84-30851

W

WALKING

Walking erect as a factor in development of arterial hypertension in primates N84-30845

WALL FLOW

Wall pressure signature wind-tunnel wall-constraint correction methods [BAE-ARG-188] N84-29887

WALL PRESSURE

Wall pressure signature wind-tunnel wall-constraint correction methods [BAE-ARG-188] N84-29887

The influence of a wind tunnel on helicopter rotational noise: Formulation of analysis [NASA-TM-85962] N84-30687

WALLS

Modeling the interaction of high power ion or electron beams with solid target materials [DE84-009126] N84-30931

WAR GAMES

Computer graphics enhancement for COMEL (communications electronics) [AD-A141920] N84-30741

WARFARE

Some aerodynamic discoveries and related NACA/NASA research programs following World War 2 [NASA-TM-86258] N84-29847

WASHINGTON

Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys [DE84-012547] N84-30519

WASTE DISPOSAL

Role of trench caps in the shallow land burial of low level wastes [DE84-011824] N84-30944

Ambient temperature testing of the G-tunnel heated block [DE84-009927] N84-30945

A study of research needs and priorities in radioactive waste management [DE84-009045] N84-30946

King's Trough Flank: Geological and geophysical investigations of its suitability for high-level radioactive waste disposal [IOS-166] N84-30950

WASTE ENERGY UTILIZATION

Engineering research on positive displacement gas expanders, phase 1 [DE84-008977] N84-30310

WASTE HEAT

Engineering research on positive displacement gas expanders, phase 1 [DE84-008977] N84-30310

WASTE TREATMENT

Operation and maintenance of selected ozone and ultraviolet disinfection systems [PB84-180124] N84-30719

WASTE UTILIZATION

Determination of thermal-degradation rates of some candidate Rankine-cycle organic working fluids for conversion of industrial waste heat into power [DE84-009585] N84-30304

WASTE WATER

Operation and maintenance of selected ozone and ultraviolet disinfection systems [PB84-180124] N84-30719

WATER

Desert emergency - lack of water - how to find and collect water. Plants and human survival in the desert [AD-A142025] N84-30513

WATER CURRENTS

Continental shelf processes affecting the oceanography of the South Atlantic Bight [DE84-010113] N84-30635

Long-term salinity, temperature and current measurements in upper Chesapeake Bay [PB84-180280] N84-30636

WATER FLOW

Thermal ground water flow systems in the thrust zone in southeastern Idaho [DE84-011598] N84-30517

Long-term salinity, temperature and current measurements in upper Chesapeake Bay [PB84-180280] N84-30636

WATER HEATING

Integrated gas-fired space heating/water heating system with electric air conditioning [PB84-181999] N84-30138

WATER LOSS

Circulatory changes in orthostatic position in the presence of hyperthermia N84-30847

WATER MANAGEMENT

Identification and preliminary characterization of global water resource issues which may be affected by CO2-induced climate change [DE84-011127] N84-30604

WATER POLLUTION

Inland aquatic resources and biogeochemical cycles N84-30438

Partitioning of toxic trace metals between solid and liquid phases in the Great Lakes [PB84-177849] N84-30525

WATER QUALITY

Water resources data for Massachusetts and Rhode Island, water year 1982 [PB84-180009] N84-30521

Water resources data for Arkansas, water year 1982 [PB84-181296] N84-30522

WATER RESOURCES

Inland aquatic resources and biogeochemical cycles N84-30438

Water resources data for Massachusetts and Rhode Island, water year 1982 [PB84-180009] N84-30521

Water resources data for Arkansas, water year 1982 [PB84-181296] N84-30522

Water resources data for Alabama, water year 1982 [PB84-183250] N84-30523

Identification and preliminary characterization of global water resource issues which may be affected by CO2-induced climate change [DE84-011127] N84-30604

WATER TEMPERATURE

Long-term salinity, temperature and current measurements in upper Chesapeake Bay [PB84-180280] N84-30636

WATER VAPOR

Effects of water-vapor on friction and deformation of polymeric magnetic media in contact with a ceramic oxide [NASA-TM-83727] N84-30072

WATER WAVES

Wave uplift pressure on horizontal platforms [PB84-190628] N84-30257

USSR report: Earth sciences [JPRS-UES-84-006] N84-30479

Ocean Energy Technology Program
[DE84-012052] N84-30542
Wave force investigations at the second Christchurch Bay Tower
[NMI-R177] N84-30626
US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141610] N84-30627
The breaking of ocean surface waves
[AD-A142356] N84-30629
Summary of SAR (Synthetic Aperture Radar) ocean wave data archived at ERIM (Environmental Research Institute of Michigan)
[AD-A142620] N84-30633
Documentation of wave-height and tidal analysis programs for automated data acquisition and control systems
[AD-A142679] N84-30634

WAVE ATTENUATION
Wave attenuation and mode dispersion in a waveguide coated with lossy dielectric material
[NASA-CR-173620] N84-30145
Invention of a tunable damper for use with an acoustic waveguide in hostile environments
[DE84-013109] N84-30697

WAVE DISPERSION
Wave attenuation and mode dispersion in a waveguide coated with lossy dielectric material
[NASA-CR-173620] N84-30145
Numerical and analytical studies of steady detonation waves with expansion losses
[AD-A142601] N84-30232

WAVE FUNCTIONS
Calculation of molecular final states and their effect on a precision neutrino mass experiment
[DE84-011071] N84-30921
Fractional quantization of the Hall effect
[DE84-008894] N84-31023

WAVE INTERACTION
The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas
[IPPJ-676] N84-30964

WAVE PROPAGATION
A study of distributed millimeter-wave isolators
[AD-A142729] N84-30189
Numerical and analytical studies of steady detonation waves with expansion losses
[AD-A142601] N84-30232
A theory for cross-coupling in ultrasonic transducer arrays
[DE84-010327] N84-30259
Development of a high-pressure quasi-isentropic plane wave generating capability
[DE84-011619] N84-30348
Propagating long waves on oceanic density fronts: An analytic model
[AD-A141915] N84-30628
A finite element method for treating nearly one way wave propagation
[DE84-010294] N84-30889
On measuring the acoustic intensity of hydroacoustic sources
[AD-A142484] N84-30893
Propagation of acoustic waves in partially saturated porous media
[DE84-010536] N84-30896
Observed current enhancement with propagation of the ETA electron beam in air
[DE84-010558] N84-30909
Theoretical studies of Elmo Bumpy Torus (EBT)
[DE84-010814] N84-30978
Linear theory of lower hybrid heating
[DE84-010577] N84-30979
Realistic modelling of lower hybrid current drive with multiple codes
[DE84-010576] N84-30982

WAVEFORMS
Dual aperture dipole magnet with second harmonic component
[DE84-011305] N84-30856

WAVEGUIDES
Wave attenuation and mode dispersion in a waveguide coated with lossy dielectric material
[NASA-CR-173620] N84-30145
Invention of a tunable damper for use with an acoustic waveguide in hostile environments
[DE84-013109] N84-30697

WAVELENGTHS
Observation of scattered light between Omega-2 and 3/2-Omaga in short wavelength laser produced plasmas
[DE84-012533] N84-31001

WEAK INTERACTIONS (FIELD THEORY)
Investigation of the structure of photosynthetic reaction centers
[DE84-012475] N84-30005
Weak corrections to the e+e-yields mu+mu-asymmetry
[DO-TH-83-16] N84-30939

WEAPON SYSTEMS
R and M (Reliability and Maintainability) program review elements document (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142073] N84-30322
Improving system affordability
[AD-A142387] N84-31062

WEATHER FORECASTING
Tropospheric science N84-30447
An assessment of interactive graphics processing in short-range terminal weather forecasting
[AD-A142706] N84-30601
Zones
[PB84-174325] N84-30616
Program for Regional Observing and Forecasting Services (PROFS)
[PB84-179926] N84-30618
National Weather Service hurricane probability program
[PB84-182757] N84-30619
Studies of statistical techniques to evaluate weather modification. Volume 1: Reports of OSET
[PB84-182906] N84-30620

WEATHER MODIFICATION
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30892

WEATHER STATIONS
Weather summaries for Coram Experimental Forest, Northwestern Montana: An international biosphere reserve
[PB84-182443] N84-30615

WEATHERING
Tensile crack exposure tests. Statistical analysis of the long-term durability of series B beams
[AD-A141955] N84-30335

WEATHERPROOFING
Fluorothermoplastics for long life, weatherproof composites
[BMFT-FB-T-84-082] N84-30096

WEBS (SUPPORTS)
Design considerations for shear links in eccentrically braced frames
[PB84-192186] N84-30136

WEIGHT (MASS)
The liquid bipropellant stage concept: Filling the OTV gap N84-29936

WEIGHTING FUNCTIONS
Solving crack problems with analytical techniques and the finite elements method
[BLL-RISLEY-TR-4940-(9091.9F)] N84-30325

WEIGHTLESSNESS
Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652
NASA space biology accomplishments, 1983-84
[NASA-TM-86654] N84-30664

WEIGHTLESSNESS SIMULATION
USSR report: Space Biology and Aerospace Medicine, vol. 18, no. 3, May - June 1984
[JPRS-USB-84-005] N84-30642
Effect of dihydroergotamine on human circulation during orthostatic tests N84-30646

WELD STRENGTH
Characterization of submerged-arc and gas-metal-arc weldments in hY-100 steel
[AD-A141939] N84-30298

WELDED JOINTS
Characterization of submerged-arc and gas-metal-arc weldments in hY-100 steel
[AD-A141939] N84-30298
Upset weld study for joining 304L stainless steel tubes
[DE84-011507] N84-30313

WELDING
Upset weld study for joining 304L stainless steel tubes
[DE84-011507] N84-30313

WEST VIRGINIA
Final comparison of TM and MSS data for surface mine assessment in Logan County, West Virginia N84-30430

WETLANDS
Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data
N84-30419
Delineation of wetland boundaries using vegetation within the Altamaha River Basin of Georgia
[AD-A142590] N84-30515
Wetlands: Their use and regulation
[PB84-175918] N84-30581
Global Biology Research Program: Biogeochemical Processes in Wetlands
[NASA-CP-2316] N84-30665
Executive summary: Background N84-30666
Geographic distribution of wetland parameters: The foundation of a data base N84-30667
A framework for wetlands research: Development of a wetlands data base N84-30668

WHISKER COMPOSITES
Growth and characterization of metal oxide whiskers for aerosol filtration
[DE84-011049] N84-31021

WHITE NOISE
A nonstandard construction of Levy Brownian motion
[REPT-82] N84-30661

WIGGLER MAGNETS
Orbital stability in combined uniform axial and three-dimensional wiggler magnetic fields for free-electron lasers
[NASA-TM-83753] N84-30273
Free electron lasers and related topics
[DE84-011332] N84-30277

WIND (METEOROLOGY)
US average wind power by season
[DE84-012214] N84-30613
Wind-generated noise in shallow water
[AD-A141981] N84-30890

WIND DIRECTION
Directional extreme wind speed data for the design of buildings and other structures
[PB84-178847] N84-30139
High yield wind energy resources in the mid-Hudson River basin
[PB84-184951] N84-30530
Passive yaw damping of a teetered rotor versus delta-3 angle values
[DE84-009758] N84-30545

WIND EFFECTS
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30608
Long-term salinity, temperature and current measurements in upper Chesapeake Bay
[PB84-180280] N84-30636

WIND RIVER RANGE (WY)
Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413

WIND SHEAR
A method for three-dimensional modeling of wind-shear environments for flight simulator applications
[NASA-TM-85969] N84-29857
Prediction of slant wind shear with an offset tower observation system
[AD-A142676] N84-30600

WIND TUNNEL TESTS
Fuel savings potential of the NASA Advanced Turboprop Program
[NASA-TM-83736] N84-29878
Wall pressure signature wind-tunnel wall-constraint correction methods
[BAE-ARG-188] N84-29887
Magnetic suspension and balance system study
[NASA-CR-3802] N84-29888
Half-model testing in the NLR high speed wind tunnel (HST)
[NLR-TR-82123-U] N84-29891
Description and validation of the two dimensional test setup for multiple airfoils in the pressurized wind tunnel HST
[NLR-TR-83031-U] N84-29892
Wind tunnel tests on a tube-launched missile configuration with a deflectable nose control and a novel wrap-around fin stabiliser
[AD-A142082] N84-29900

WIND TUNNEL WALLS
The influence of a wind tunnel on helicopter rotational noise: Formulation of analysis
[NASA-TM-85962] N84-30887

WIND TURBINES
Passive yaw damping of a teetered rotor versus delta-3 angle values
[DE84-009758] N84-30545
Overview of wind turbine siting considerations
[DE84-011686] N84-30547

WIND VARIATIONS
Passive yaw damping of a teetered rotor versus delta-3 angle values
[DE84-009758] N84-30545

WIND VELOCITY
Directional extreme wind speed data for the design of buildings and other structures
[PB84-178847] N84-30139
Quasi-two-day variation of lower thermosphere wind velocities N84-30488
High yield wind energy resources in the mid-Hudson River basin
[PB84-184951] N84-30530

Operation and calibration of the Wincharger 450 model SWECS
[DE84-009757] N84-30546
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30608
Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30892

WIND VELOCITY MEASUREMENT
Operation and calibration of the Wincharger 450 model SWECS
[DE84-009757] N84-30546
Wind energy assessment for western Maryland
[PB84-184613] N84-30553
Prediction of slant wind shear with an offset tower observation system
[AD-A142676] N84-30600
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30608

WINDOWS (APERTURES)
Field repair of AH-16 helicopter window cutting assemblies
[NASA-TM-85831] N84-29864
Fire induced flows through room openings - flow coefficients
[PB84-176759] N84-30011
Electrochromic materials for the regulation of solar energy transmission through windows
[DE84-012165] N84-31029

WINDPOWER UTILIZATION
High yield wind energy resources in the mid-Hudson River basin
[PB84-184951] N84-30530
Is the wind a practical source of energy for you?
[DE84-010938] N84-30541
Passive yaw damping of a teetered rotor versus delta-3 angle values
[DE84-009758] N84-30545
Overview of wind turbine siting considerations
[DE84-011686] N84-30547
German-Argentinian R and D project for the utilization of wind energy
[BMFT-FB-T-84-080] N84-30549
Wind energy assessment for western Maryland
[PB84-184613] N84-30553
On-site analysis to assess the feasibility of wind power
[DE84-009762] N84-30606
US average wind power by season
[DE84-012214] N84-30613

WINDPOWERED GENERATORS
German-Argentinian R and D project for the utilization of wind energy
[BMFT-FB-T-84-080] N84-30549

WIRE
Analysis of fracture modes during extrusion and drawing of bimetal rods or wire
[DE84-009849] N84-30051
Computer-generated movie on the short pulse electromagnetic behavior of wire objects
[DE84-012032] N84-30162

WORD PROCESSING
Communicating between the IBM personal computer and the Wang word processing system
[DE84-010423] N84-30729

WORK
Chronic effects of repeated mechanical trauma to the skin: A description of the problem in the workplace
[PB84-181767] N84-30695

WORK CAPACITY
Use of vitamins during adaptation to high altitudes
N84-30643
Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654
Exchange of gases and physical work capacity in natives of different geographic regions N84-30656

WORKING FLUIDS
A blowup phenomenon of the working fluid in a two-phase closed thermosyphon N84-30122
An experimental study of helical guide-type rotating heat pipe N84-30123
Experimental study of the naphtaline heat pipe
N84-30125

WORKLOADS (PSYCHOPHYSIOLOGY)
The measurement of pilot performance: A master-journeyman approach
[AD-A142457] N84-30698

WORLD METEOROLOGICAL ORGANIZATION
World meteorological activities report
[WMO-628] N84-30614

WROUGHT ALLOYS
Fatigue behavior of long and short cracks in wrought and powder aluminum alloys
[AD-A142609] N84-30024

X

X RAY APPARATUS
VUV instrument calibrations for laser-plasma studies
[DE84-010507] N84-30974

X RAY SOURCES
Activities in astronomy
[ISSN-0531-4496] N84-31067

X RAY SPECTRA
High resolution, high rate X-ray spectrometer
[DE84-011116] N84-30266

X RAY TUBES
Rigid indented cylindrical cathode for X-ray tube
[DE84-011093] N84-30204
X-ray beam finder
[DE84-011100] N84-30916

X RAYS
Preliminary result of our new Nationwide Evaluation of X-ray Trends (NEXT) program for Italy
[ISS-L-84/3] N84-30693
X-ray beam finder
[DE84-011100] N84-30916
Studies of X-ray clusters of galaxies/intergalactic plasmas
[NASA-CR-173825] N84-31068

XENON
Resonance ionization spectroscopy of argon, krypton and xenon using vacuum ultraviolet light
[DE84-011655] N84-30006

XENON LAMPS
A program to improve solar blind UV (ultraviolet) flash lamps
[AD-A141909] N84-30177

Y

YAW
Passive yaw damping of a teetered rotor versus delta-3 angle values
[DE84-009758] N84-30545

Z

ZINC TELLURIDES
RF sputtering and annealing of amorphous zinc telluride films
[USIP-84-04] N84-30061

ZINC-BROMIDE BATTERIES
Zinc/bromine batteries: A status review
[DE84-008973] N84-30206

ZINC-CHLORINE BATTERIES
Rechargeable zinc batteries
[DE84-008947] N84-30192

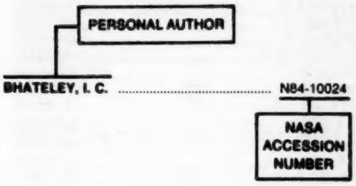
ZIRCONIUM ALLOYS
Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti
[DE84-005411] N84-30043

ZIRCONIUM OXIDES
Lead zirconate-lead titanate (PZT) ceramics from organic-derived precursors
[DE84-009921] N84-30095

PERSONAL AUTHOR INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 22 NUMBER 20

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABATE, J. A. N84-30960
ABBOTT, M. R. N84-30437
ABDALLAH, S. N84-30851
ABDELSALAM, M. K. N84-29868
ABDULGAFAROV, S. Y. N84-30867
ABE, Y. N84-30125
ABRAMS, R. B. N84-30366
N84-30371
ABRANSON, S. R. N84-30716
ABROSIMOV, S. V. N84-30646
ACEVEDO, W. N84-30510
ACHTOR, T. H. N84-30571
ACKERMAN, M. N84-30565
ACKLESON, S. G. N84-30424
ACKLEY, S. F. N84-30446
ACTIS, R. N84-30187
ADAMS, W. M., JR. N84-29863
ADAR, E. N84-30527
ADLER, R. J. N84-30847
AEPLI, T. C. N84-30361
AGADZHANYAN, N. A. N84-30656
AGEYEV, Y. I. N84-30664
AGROSKIN, L. S. N84-30663
AGYEKUM, E. N84-31014
AHRENS, T. J. N84-30056
AKPEROV, M. M. N84-30664
ALDRICH, C. H. N84-30582
ALEKSANDROV, V. V. N84-30674
ALEXANDER, C. A. N84-30941
ALEXANDER, D. N84-30510
ALFEROV, Z. I. N84-30666
ALFORD, W. L. N84-30401
N84-30407
ALLBRITAIN, R. H. N84-29907
ALLEN, S. L. N84-30932
ALLIN, A. P. N84-30880
ALLISON, D. W. N84-29681
ALVARES, N. J. N84-29996
AMAGISHI, Y. N84-30966
AMIS, M. L. N84-30398
ANASHKIN, O. D. N84-30646
ANDERSON, C. W. N84-29945
ANDERSON, G. L. N84-30531
ANDERSON, J. E. N84-30405
ANDERSON, O. A. N84-30942
ANDERSON, W. H. N84-30421
ANUTA, P. E. N84-30381
N84-30394
ANZIC, G. N84-30147
APPEL, M. A. N84-29910
N84-29934
APPLETON, B. R. N84-30052
ARMENDARIZ, M. G. N84-31017
ARMSTRONG, W. T. N84-30654
ARORA, J. S. N84-30356
ARVIDSON, R. N84-30442
ASADA, H. N84-30811
N84-30827
ASHMORE, C. I. N84-29954
ASKINS, H. W., JR. N84-30166
ASTRELIN, V. T. N84-30934
ATHANS, M. N84-30606
AUBERT, J. H. N84-30261
AULD, B. A. N84-31011
AUSLANDER, T. W. N84-29917
AUSTIN, J. S. N84-31035
AVERYANOV, V. L. N84-30667
AVITZUR, B. N84-30051
AXENATH, K. H. N84-30549
AYEN, W. E. N84-30722
AYRAULT, G. N84-30053
AZUMA, Y. N84-29966

B

BAARS, E. P. N84-30144
BABAITSEV, I. V. N84-30102
BACA, L. S. N84-30842
BACON, R. J. N84-30017
BAER, D. R. N84-30025
BAER, M. R. N84-30002
BAER, R. L. N84-30259
BAIK, J. M. N84-30054
BAILEY, B. N84-30530
BAILEY, B. R. N84-29963
BAILEY, C. R. N84-29927
BAKER, D. J. N84-29971
BAKER, J. R. N84-30428
BAKER, W. M., II N84-30948
BAKKER, H. N84-30711
BALDWIN, D. B. N84-30788
BALDWIN, D. L. N84-30314
BALICK, L. K. N84-30421
BALK, P. N84-30711
BALL, D. L. N84-30366
N84-30371
N84-30373
BALZER, D. L. N84-29917
BAME, S. J. N84-30582
BANDY, R. N84-30032
N84-30033
BANERJEE, S. K. N84-30077
BANKS, G. N84-30362
BANKS, H. T. N84-29903
BAOCHENG, G. N84-30068
BARBEE, J. G. N84-30076
BARBER, J. P. N84-29929
BARCLAY, R. C. N84-29898
BARDIN, B. M. N84-30755
BARHEN, J. N84-30815
BARKER, J. L. N84-30359
N84-30362
N84-30366
N84-30371
N84-30372
N84-30373
N84-30374
N84-30376
N84-30380
N84-30402
BARKER, L. M. N84-30348
BARNES, C. W. N84-30984
N84-30985
N84-30986
N84-30987
BARNES, P. R. N84-30166
BARNUM, S. R. N84-30795
BARNWELL, T. P., III N84-30150
BARR, S. W. N84-29990
BARRETO, E. N84-30967
BARTLETT, D. S. N84-30665
BARTOLUCCI, L. N84-30381
BASOV, N. G. N84-30661
BATES, C. W., JR. N84-30537
BATSON, R. M. N84-30397
BATTERTON, P. G. N84-29676
BAUER, F. N84-30994
BAUGHMAN, J. R. N84-29965
BAUM, H. R. N84-30011
BAXTER, D. J. N84-30039
N84-30043
BEBEE, J. L. N84-31041
BEJAR, I. I. N84-30599
BELAKOVSKIY, M. S. N84-30643
BELAND, R. R. N84-30186
BELDE, A. P. N84-30254
BELENKIY, Y. M. N84-30660
BELKANIYA, G. S. N84-30645
BELL, J. R. N84-30073
BELOKRINITSKIY, V. S. N84-30678
BELOV, V. F. N84-30492
BELOZEROV, G. Y. N84-30644
BEMENT, L. J. N84-29664
BENDEL, W. L. N84-30771
BENDER, L. V. N84-30390
BENDOT, J. G. N84-29962
BENEDICK, W. B. N84-29997
BENELHADJSAID, C. N84-30075
BENJAMIN, B. C. N84-30959
BENNETT, D. N84-30404
BENNETT, J. P. N84-30098
N84-30099
BERENS, A. P. N84-30320
BEREZHIANI, V. I. N84-30964
BERG, L. E. N84-30009
BERGER, R. N84-30206
BERGER, R. L. N84-30276
BERGMAN, R. C. N84-29991
BERK, H. L. N84-31003
BERKMAN, D. K. N84-29934
BERNARD, E. N. N84-30636
BERNARD, L. C. N84-30976
BERNSTEIN, J. N84-30176
BERNSTEIN, R. N84-30370
BERTERO, V. V. N84-30343
N84-30355
BERTONI, H. L. N84-30183
BERTRAND, R. M. N84-30786
BESSON, J. N84-30565
BESUNER, P. M. N84-29681
BETANCOURT, O. N84-30994
BEYER, E. P. N84-30367
BIANCHINI, G. M. N84-30267
BIEDENHARN, L. C. N84-30639
BILARDI, G. N84-30723
BILLINGS, S. A. N84-30844
N84-30845
BIRD, C. R. N84-30974
BISBEY, R., II N84-30772
BISHOP, D. E. N84-30692
BISHOP, J. R. N84-30626
BIZZELL, R. M. N84-30415
N84-30422
BJORKLUND, R. A. N84-29910
N84-29923
BLACKBURN, M. R. N84-30697
BLAKE, R. D. N84-30295
BLANCH, H. W. N84-30110
BLANCHARD, D. O. N84-30623
BLANDA, M. T. N84-29966
BLANEY, J. I. N84-30575
BLASEWITZ, R. M. N84-30762
BLICKWEDEL, T. W. N84-30208
BLODGET, H. W. N84-30430
BLUE, G. D. N84-29919
N84-29920
BOARD, M. P. N84-30945
BOATWRIGHT, G. O. N84-30425
BOCCHIERI, J. R. N84-30617
BOEH, M. N84-30546
BOELCS, A. N84-29680
BOENING, H. J. N84-30660
BOERSEN, S. J. N84-29691
BOERSTOEL, J. W. N84-30253
BOES, E. C. N84-30532
BOESCH, N. N84-30665
BOFILIOS, D. A. N84-30668
BOGDANOV, N. G. N84-30643
BOGO, V. N84-30690
BOGUTA, J. N84-30947
BOHACHEVSKY, I. O. N84-30613
BOHM, A. N84-30639
BOICOURT, W. C. N84-30636
BOKHARI, S. H. N84-30800
BON, E. N84-30790

BONNET, J. A., JR. N84-30552
BONOLI, P. N84-30979
N84-30981
N84-30982
BOOM, R. W. N84-29888
BORGESON, W. T. N84-30397
BORIS, J. P. N84-30230
BOROVOY, A. G. N84-30492
BORZYAK, Y. V. N84-30880
BOSTROEM, R. N84-30588
BOUCHIER, J. L. A. N84-30213
BOUGERET, J. L. N84-31079
BOUGHNER, R. E. N84-30566
BOWELL, E. N84-31066
BOWERS, D. G. N84-31037
BOWLES, K. N84-30764
BOYER, K. G. N84-30927
BRADLEY, P. F. N84-29897
BRADY, M. N84-30810
N84-30811
N84-30827
BRANDRUP, J. N84-30096
BRASHWELL, J. H. N84-30515
BRAY, R. S. N84-29857
BREAKER, L. C. N84-30632
BREISACHER, P. N84-29922
BREWER, J. M. N84-31021
BRIGHAM, W. E. N84-30246
BRIGHAM, W. P. N84-30199
BRINCKMAN, F. E. N84-30100
BRISKIN, L. N84-30743
BRITT, D. N84-30772
BRITTON, D. L. N84-30528
BRODECKI, R. D. N84-30017
BRONISZ, S. E. N84-30943
BROOKS, J. N84-30368
N84-30409
BROOKS, R. D. N84-30286
BROTSKY, D. C. N84-30773
BROWN, H. A. N84-30600
BROWN, L. F. N84-30580
BROWN, L. M. N84-31049
BROWN, R. W. N84-30939
BRUSVEN, M. A. N84-30526
BRYANT, N. A. N84-30392
BRYANT, P. J. N84-30545
N84-30546
BUCHANAN, G. M. N84-30957
BUCK, O. N84-30054
BUCKLEY, D. H. N84-30072
BUDYKO, M. N84-30480
BUELL, R. H. N84-30589
BUGNON, F. J. N84-30823
BUIS, J. N84-30510
BUNING, P. G. N84-30225
BUONI, J. J. N84-30761
BURCHAM, F. W., JR. N84-29879
BURKE, G. J. N84-30164
BURKE, W. R. N84-30317
BURLITCH, J. M. N84-29992
BURT, R. H. N84-29964
BUSCH, G. N84-30276
BUSCH, G. E. N84-30269
BUSHBY, H. N84-30304
BUTCHER, B. M. N84-30342
BUTLIN, T. N84-30378
BYCHKOV, V. P. N84-30658
BYERS, F. M., JR. N84-30584
BYKOV, A. I. N84-30872
BYKOVSKIY, N. Y. N84-30880

C

CALICCHIA, A. N84-30693
CALLAWAY, J. M. N84-30604
CAMPBELL, A. B. N84-30724
CAMPBELL, J. G. N84-29912
CAMPBELL, S. L. N84-30820
CAMPISI, I. E. N84-31030
CARAN, S. C. N84-30578
CARD, D. N84-30510
CARD, D. H. N84-30396
CARDEN, H. D. N84-29975
CAREY, R. P. N84-30333
CARLSTEN, J. L. N84-30285
CARNES, J. N84-30415
CARPENTER, R. L. N84-30001
CARR, K. R. N84-30264
CARR, W. J. N84-30584
CARRETERO, S. N84-29980
CARSON, W. E. N84-30946
CARTER, J. E. N84-29854
CARUTHERS, C. N84-30786
CASANOVA, M. N84-30790
CASTLE, J. G., JR. N84-31017
CASTLE, K. R. N84-30383
CAVERLY, P. N84-30751
CECCHI, J. L. N84-30044
CEDRONE, L. N84-30738
CELORIER, G. M. N84-30138
CERMAK, M. N84-30869
CHA, Y. S. N84-30971
CHAFFIN, R. N84-30701
CHAFFIN, R. J. N84-31007
CHALLITA, A. N84-29929
CHAMBERLIN, J. L. N84-30206
CHAN, S. S. N84-31012
CHAN, T. F. N84-30833
CHAN, V. S. N84-30993
CHANG, F. H. N84-30073
CHANGERY, M. J. N84-30139
CHANGNON, S. A., JR. N84-30620
CHANNELL, P. J. N84-30836
CHAO, B. F. N84-30462
CHAPMAN, A. J., III N84-29972
CHAPMAN, R. N. N84-30261
CHASE, R. N84-30444
CHATURVEDI, P. N84-30572
CHAUDHRY, A. H. N84-30148
CHAUSSEE, D. S. N84-30225
CHAVEZ, P. S., JR. N84-30389
CHAZELLE, B. N84-30824
CHEN, A. T. F. N84-30591
CHEN, C. N84-30045
N84-30047
CHEN, F. F. N84-31004
CHEN, J. N84-30572
CHEN, S. S. N84-30237
N84-30240
CHEUNG, L. H. N84-31069
CHICHAGOV, P. K. N84-30653
CHISHOLM, D. A. N84-30601
CHOTAI, A. N84-30134
N84-30733
CHOU, Y. T. N84-30051
CHRIEN, R. E. N84-30854
N84-30915
CHRISTENSEN, N. N84-29948
CHRISTODOULIDIS, D. C. N84-30456
N84-30461
CHRISTOPHOROU, L. G. N84-30212
CHU, M. S. N84-30841
N84-30976
CHUANG, S. C. N84-30109
CHUANG, S. L. N84-30145
CHUANG, S. Y. N84-30073
CHUPP, W. N84-30912
CHURCH, R. H. N84-30172
CHYLEK, P. N84-30611
CICONE, R. C. N84-30387
CLANCY, T. A. N84-30099
CLARK, J. C. N84-30909
CLARK, W. A. T. N84-30050
CLAUSEN, L. C. N84-29963
CLAYTON, J. C. N84-30015
CLAYTOR, T. N. N84-30262
CLEMENTS, W. E. N84-30607
CLENDENIN, J. E. N84-30907
CLINARD, F. W., JR. N84-30082
COATS, D. W. N84-30608
COFFEY, H. E. N84-31073
N84-31074
N84-31076
N84-31077
N84-31078
COGAN, K. J. N84-30750
COHEN, M. L. N84-30604
COHEN, S. C. N84-30455
N84-30457
COLE, S. N84-31010
COLEMAN, H. W. N84-30227
COLGATE, S. A. N84-31080
N84-31081
COLLINS, A. C. N84-30685
COLTMAN, J. W. N84-29868
COLTON, D. L. N84-30894
COLWELL, R. N. N84-30411
COMER, E. R. N84-30763
COMLY, J. C., JR. N84-30279
CONEL, J. E. N84-30413
CONKIN, J. N84-30684
CONLON, E. J. N84-31035
CONN, R. W. N84-30969
CONNOLLY, D. J. N84-30147
CONNON, T. R. N84-29872
CONRAD, M. R., JR. N84-30741
COOK, D. C. N84-31014
COOMBS, P. G. N84-30059
COOPER, F. N84-31031
COOPER, L. P. N84-29937
COOPER, R. J. N84-30515
COOPER, R. K. N84-30279
COOPER, S. N84-30012
COPELAND, R. J. N84-30534
COUNTRYMAN, P. N84-30784
COURTNEY, E. J. N84-30200
COY, J. J. N84-30293
N84-30294
CRAFTS, R. E. N84-30757
CRANDALL, K. R. N84-30920
CRAWFORD, D. B. N84-29879
CREPEAU, P. J. N84-30153
CREUTZ, M. N84-30923
CRIST, E. P. N84-30387
CROSSMAN, F. W. N84-29978
CROUCH, P. E. N84-30852
CROWLEY, F. A. N84-30575
CURRIE, J. W. N84-30604
CUTKOSKY, M. R. N84-30129

D

DAFT, R. L. N84-31035
DAILEY, C. L. N84-29930
DALE, B. C. N84-31054
DANILOV, A. Y. N84-30881
DANN, R. N84-30496
DARTSMELIYA, V. A. N84-30645
DASILVA, R. T. N84-29899
DAUGHERTY, C. E. N84-30057
DAVENPORT, A. S. N84-31037
DAVID, D. N84-29925
DAVIES, P. B. N84-30010
DAVIS, R. L. N84-29854
DAVYDOV, B. I. N84-30657
DAWSON, J. M. N84-30992
DEAN, E. N84-30381
DEASE, C. G. N84-30162
DECKER, R. N84-30939
DEGLORIA, S. D. N84-30411
DEHMER, J. L. N84-30917
N84-30925
DEHMER, P. M. N84-30917
N84-30925
DEIBLER, L. N84-29867
DEICHELBOHRER, P. R. N84-30308
DEJONGH, J. N84-29849
DELANEY, I. C. N84-30001
DELORD, T. J. N84-29966
DELOUW, C. N84-30712
DELWICHE, C. C. N84-30436
DEMIRGIAN, J. N84-30304
DEMKO, S. G. N84-30831
DENBOER, M. L. N84-31020
DENISON, R. L. N84-31033
DERBLOM, H. N84-30588
DERUYTER, H. N84-30176
DESAUSSURE, G. N84-30815
DESCHAMPS, P. Y. N84-30385
DETANG, Z. N84-30070
DEVEREUX, V. G. N84-30141
DEVRIES, D. J. N84-30399
DEXTER, H. B. N84-29971
DEXUAN, Y. N84-30068
DEYOUNG, T. F. N84-30726
DIAMOND, R. M. N84-30929
DICKINSON, K. N84-30377
DICKSON, C. L. N84-30106
DICKSON, J. N. N84-29976
DICUS, D. A. N84-30933
DIEBOLD, R. N84-30908
DIERLAM, J. J. N84-30684
DIMSDALE, J. S. N84-30357
DINGUIRARD, M. N84-30383
DIPPE, D. N84-29862
DIPPOLITO, D. A. N84-30999
DMITRIU-VALCEA, E. J. N84-30139
DOBELIS, M. A. N84-30652
DOCTOR, S. R. N84-30323
DOI, T. N84-30103
DOLOTENKO, M. I. N84-30872
DONNELLEY, J. E. N84-30805
DONNELLY, R. F. N84-31070
DORONINA, T. D. N84-30653
DOROSHKEVICH, I. L. N84-30880
DOSCH, R. G. N84-30095
DOUGHERTY, H. T. N84-30170
DOVER, C. B. N84-30905
DOWNEY, A. N. N84-30147
DOWNEY, R. M. N84-30729
DOWNS, A. L. N84-30725
DOZIER, J. N84-30426
DRAGUZYA, M. D. N84-30654
DRAKE, J. N84-30572
DRAKE, R. H. N84-30539
DRANSFELD, P. N84-30010

DREIER, T. N84-30008
DRESS, W. B., JR. N84-30857
DRESSLER, G. A. N84-29918
DREWERY, J. O. N84-30142
DREYFUSS, P. N84-29960
DROCEA, C. N84-30751
DRUMMOND, A. M. N84-29855
DUBOIS, P. J. N84-30805
DUFF, P. N84-30378
DUFOUR, L. B. N84-30352
DUGGIN, M. J. N84-30400
DUKOWICZ, J. K. N84-30837
DUNCAN, L. F. N84-29906
DUNCAN, L. M. N84-30576
DUNLOP, R. K. N84-29962
DUNNING, G. J. N84-30951
DUNNING, J. S. N84-30101
DUPRE, R. R. N84-30583
DURHAM, D. L. N84-30634
DUTCHER, F. R. N84-30664
DUTTON, E. J. N84-30170
DWEK, E. N84-31069
DWYER, L. C. N84-30578
DYKSTRA, J. D. N84-30412

E

ECKLUND, S. D. N84-30907
EDDS, J. N84-30522
EDRINGTON, T. S. N84-30161
EHLERS, K. W. N84-30201
N84-30918
EHSANI, M. N84-30193
EISCHEN, J. W. N84-29881
EISLER, R. N84-30888
ELAND, T. N84-30705
N84-30714
ELBER, W. N84-30331
ELIAS, R. W. N84-30562
ELIASON, E. M. N84-30389
ELIGEHAUSEN, R. N84-30355
ELLSEASSER, H. W. N84-30577
ELSBERRY, R. L. N84-30631
ELSHAZLY, A. G. N84-30578
EMILY, D. N84-30724
ENGEL, J. N84-30363
N84-30365
ENGERER, S. C. N84-29963
ENGLADE, R. N84-30981
N84-30982
ENTINE, G. N84-30533
ERBSCHLOE, D. R. N84-30952
ERICKSON, E. D. N84-29882
ERINGEN, A. C. N84-30340
ESSEN, H. N84-30144
ETHRIDGE, C. D. N84-30804
ETORI, K. N84-30121
EVANS, J. W. N84-30062
N84-30241
EVERETT, J. R. N84-30412
EVERSOLL, D. A. N84-30518
EYSSA, Y. M. N84-29888
EZRA, C. E. N84-30383

F

FACKLER, O. N84-30921
FAETH, G. M. N84-29877
FAGAN, T. J. N84-30239
FALTENS, A. N84-30912
FALTER, C. M. N84-30526
FARKAS, Z. D. N84-31030
FARLOW, G. N84-30052
FARMER, J. K. N84-29985
FARMWALD, P. M. N84-30732
FARQUHARSON, S. N84-29986
N84-29987
FARRARA, R. A. N84-30022
FAVRE, J. P. N84-29980
FEDOROVA, N. V. N84-30486
FELDMAN, M. J. N84-30303
N84-30309
FELDMAN, U. N84-30290
N84-30995
FELDMAN, W. C. N84-30235
FELSENTREGER, T. L. N84-30468
FERLA, M. C. N84-30890
FESER, C. L. N84-30690
FEUQUAY, J. W. N84-30421
FEWELL, M. E. N84-30778
FICSOR, G. N84-30691
FILIPPOU, F. C. N84-30343
FINAOGENOVA, R. I. N84-30644
FINDLAY, J. T. N84-29901
FINK, C. R. N84-29967
FIORATTI, M. P. N84-30693
FIORE, C. N84-30981
FIRSOV, K. M. N84-30493
FISCHEL, D. N84-30369
FISCHER, G. E. N84-30207
FISH, R. L. N84-30034
FISHER, R. N84-31075
FISHER, W. M. N84-29951
FISK, J. W. N84-29997
FITGERALD, A. N84-30378
FITZGERALD, T. J. N84-30583
FLEISHMAN, E. A. N84-30696
FLEMING, E. A. N84-30377
FLETCHER, J. G. N84-30806
FLEYSHER, V. G. N84-30865
FLUESMEIER, A. L. N84-29988
FOLLANSBEE, P. S. N84-30268
FONG, Z. S. N84-30274
FORBERG, J. N84-30637
FORGHAM, J. L. N84-30955
FORSLUND, D. W. N84-30582
N84-30992
FORTUNKO, C. M. N84-30171
FRAIOLI, A. V. N84-30205
FRAME, E. A. N84-30078
FRANCIS, E. C. N84-29951
N84-29957
FRANKEL, S. N84-30740
FRANKIGNOUL, C. N84-30595
FRANSSON, T. N84-29880
N84-30297
FRANTZ, C. E. N84-30268
FRANZ, O. G. N84-31066
FRASER, J. S. N84-30910
FREEDMAN, B. N84-31031
FRENKEL, I. D. N84-30658
FRIEDMAN, S. Z. N84-30392
N84-30511
FRIETMAN, E. N84-30715
FRITZCHE, A. N84-30549
FROST, M. N84-30731
FUHR, D. C. N84-30765
FUJII, K. N84-30117
FURIA, L. N84-30670
FUSCO, L. N84-30379
N84-30382
N84-30391
FUSSELL, P. S. N84-30129

G

GABRIEL, J. R. N84-30814
GABRIEL, W. F. N84-30149
GADOURY, R. A. N84-30521
GAFFEY, J. D., JR. N84-30900
GALEENER, F. L. N84-30338
GALICHIY, A. A. N84-30881
GALICHIY, V. A. N84-30644
GALKIN, A. A. N84-30657
GALLAGHER, L. N84-30739
GANDHI, O. P. N84-30670
GANDY, R. N84-30981
GANGULI, G. N84-30572
GARABEDIAN, P. N84-30994
GARBER, F. D. N84-30158
GARCIA, C. N84-31075
GARCIA, R. R. N84-30593
GARNER, F. A. N84-30035
GARREN, A. A. N84-30858
GARRISON, P. W. N84-29932
N84-29933
GARSKE, J. D. N84-30113
GARSTANG, M. N84-30553
GARTLING, D. K. N84-30778
GARVINE, R. W. N84-30628
GARY, S. P. N84-30582
GASTEV, S. V. N84-30870
GAUL, H. N84-30535
GAUSTER, W. B. N84-30969
GAVER, D. P. N84-30829
GAYDIDEY, Y. B. N84-30884
GAYLER, J. E. N84-30428
GAZENKO, O. G. N84-30642
GEISIK, C. N84-30780
GELBARD, E. M. N84-30238
GELFAND, J. N84-29994
GELINAS, R. J. N84-30840
GELMUKHANOV, F. K. N84-30863
GENCO, L. V. N84-29872
GENIN, A. M. N84-30644
GENNETT, T. N84-29985
N84-29989
GEOFFROY, C. S. N84-29921
GERLACH, A. M. N84-30599
GERLACH, K. N84-30152
GERSTMANN, J. N84-30138
GERVIN, J. C. N84-30431
GEVER, C. N84-30578
GEZARI, D. Y. N84-31069
GHAFORY-ASHTIANY, M. N84-30354
GHODGAONKAR, D. N84-30670
GIBSON, A. N84-29999
GIBSON, E. D. N84-30037
GIDASPOW, D. N84-30128
GIEBELS, M. N84-30497
GILBERT, H. W. N84-30916
GILDNER, M. D. N84-31015
GILES, I. A. N84-30523
GILFERT, J. C. N84-30135
GILLE, J. C. N84-30448
GILLESPIE, L. K. N84-30302
N84-30305
GILROY, K. A. N84-30758
GINSBERG, L. C. N84-30601
GIORDANO, T. J. N84-29921
GIPPENREYTER, Y. B. N84-30643
GIRARD, A. N84-30565
GIROUARD, G. G. N84-30521
GIRVIN, D. C. N84-30557
GLICK, B. N84-30725
GOELLER, H. E. N84-29998
GOGINENI, S. N84-30148
GOHAR, Y. N84-30971
GOKHMAN, B. N84-30392
GOLDMAN, A. N84-30566
GOLDMAN, L. M. N84-31001
GOLDSTEIN, C. I. N84-30889
GOLDSTEIN, J. C. N84-30279
GOLDSTEIN, P. N84-30751
GOLDWIRE, H. C., JR. N84-30104
GOODENOUGH, D. G. N84-30377
GOODWIN, J. G., JR. N84-30109
GORA, Y. P. N84-30663
GORDON, D. E. N84-29865
GOREE, P. F. N84-29860
N84-29873
N84-29874
N84-30322
GORLEY, T. N84-30292
GOSLING, J. T. N84-30582
N84-30980
GOSNOLD, W. D. N84-30518
GOSSARD, E. E. N84-30622
GOTTLIEB, D. N84-30816
GOULDING, F. S. N84-30266
GOURDIN, W. H. N84-30026
GRAEWE, E. N84-30270
GRAHAM, P. H. N84-29946
GRASSI, G. N84-30790
GRAU, J. K. N84-30763
GREENBERG, W. N84-30838
GRIESE, H. N84-31082
GRIFFIN, O. M. N84-30629
GRIGGS, J. E. N84-30307
GRIGORYEV, V. Y. N84-30880
GRIMSON, W. E. L. N84-30687
GRONSKY, R. N84-30087
GROOM, T. N84-29952
GROSSBERG, S. N84-30689
GRUNDSTROM, S. N84-31057
GUARDALBEN, M. G. N84-30960
GUDAS, J. P. N84-30023
GUERTIN, F. N84-30404
GUINAN, M. W. N84-31018
GUNTHER, F. J. N84-30371
GUREVICH, Y. G. N84-30222
GURNEY, C. M. N84-30393
GUSTAFSON, H. W. N84-29848
GUSYATNIKOV, B. S. N84-30860
GUTKNECHT, W. F. N84-30012
GUTTERMAN, Y. N84-30513
GUYER, K. L. N84-29987
N84-29990

H

HAAS, R. H. N84-30421
HABA, Z. N84-31032
HACK, B. R. N84-30786
HAGEMANN, D. W. N84-29965
HAGEN, G. N84-30695
HALE, C. P. N84-30283
HALL, E. E. N84-30058
HALL, F. G. N84-30415
HALL, J. R. N84-30396
HALL, J. R., JR. N84-29859
HALOULAKOS, V. E. N84-29940
HALSTEAD, T. W. N84-30664
HAMEL, W. R. N84-30303
N84-30309

HAMER, B. J. G. N84-30254
HAMILTON, K. N84-30593
HAMILTON, P. N84-30636
HAMROCK, B. J. N84-30293
HAND, C. G. N84-30206
HAND, L. N. N84-31024
HANEY, S. J. N84-30242
HANSEN, J. E. N84-29890
HARDENSTINE, K. E. N84-30081
HARDIN, E. L. N84-30945
HARDISKY, M. N84-30419
HARDISON, D. N84-30012
HARDY, J. R. N84-30428
HARNED, D. S. N84-30961
HARPER, C. E. N84-30017
HARRIES, W. L. N84-30274
HARRIS, G. E. N84-30057
HART, H. N84-30760
HART, R. N84-30515
N84-30760
HARTMANN, G. K. N84-31059
HARTNETT, E. B. N84-30575
HARTWIG, E. C. N84-30912
HARVEY, R. W. N84-30993
HASSANEIN, A. M. N84-30931
HATORI, T. N84-30963
HAUER, J. F. N84-30860
HAUPT, G. R. N84-30042
HAUSER, M. G. N84-31068
HAVERDINGS, H. N84-29869
HAWS, L. D. N84-29909
HAWTHORNE, S. W. N84-31055
HAYDEN, C. M. N84-30571
HAYDN, R. N84-30417
HAYES, E. F. N84-30919
HAYNER, D. A. N84-30157
HAYS, P. N84-30449
HAYS, R. A. N84-30023
HAZELTINE, R. D. N84-30859
N84-30972
HAZLEWOOD, C. F. N84-30671
HECK, M. L. N84-29901
HEDBERG, A. N84-30586
HEDGEPETH, J. M. N84-30328
HEIFETZ, D. N84-30969
HEIKES, B. G. N84-30592
HEINISCH, H. L. N84-30035
HEISER, W. N84-29849
HELLER, C. A. N84-29862
HELLER, M. N84-30674
HELMS, V. T., III N84-29897
HENDERSON, D. O., JR. N84-30233
HENDERSON, K. E. N84-30427
HENDERSON, T. M. N84-30088
HENDRIOCK, H. J. N84-30096
HENDRY, A. W. N84-30903
HENG, H. N84-30068
HENINS, I. N84-30984
N84-30985
N84-30986
N84-30987
HENSHAW, W. F. N84-30079
HENSLEE, S. P. N84-30092
HERGET, C. J. N84-30789
HERING, W. S. N84-30954
HERMANNSFELDT, W. B. N84-30287
HESLINGA, G. N84-30718
HETTINGER, E. C. N84-31060
HEUBUSCH, H. P. N84-29924
HEWITT, C. N84-30809
HIGGINS, A. M. N84-29944
HILL, D. W. N84-30670
HILL, J. P. N84-30342
HILL, T. A. N84-30690
HILTON, P. W. N84-30498
HINTON, F. L. N84-30993
HOBBS, M. A. A. N84-29943
HODGE, B. K. N84-30227
HODGES, W. T. N84-29968
HOF, J. J. N84-30558
HOFFMAN, R. J. N84-29916
HOFFMANN, R. N84-29992
HOGG, H. N84-30176
HOGGE, R. N84-29849
HOIDA, H. W. N84-30984
N84-30985
N84-30986
N84-30987
HOLLAND, O. W. N84-30052
N84-31006
HOLLAND, P. W. N84-30272
HOLLINGWORTH, D. N84-30772
HOLLOWAY, F. W. N84-30288
HOLM, D. D. N84-30972
N84-30973
HOLM, R. G. N84-30383
HOLMBERG, K. N84-30318
HOLMES, J. N84-30519
HOLT, J. B. N84-30041
HONDA, I. N84-30125
HONMA, H. N84-30115
HOOD, R. R. N84-29955
HOOGENDORN, R. N84-30711
HOPKINS, S. W. N84-29881
HORN, W. H. N84-29979
HORRIGAN, D. J. N84-30684
HOSEA, J. C. N84-30086
HOSHINO, K. N84-31025
HOSKING, F. M. N84-30055
HOUSTON, A. G. N84-30427
HOVER, G. L. N84-30156
HOVEY, P. W. N84-30320
HOVIS, W. A. N84-30384
HOWELL, L. A. N84-29958
HOY, G. R. N84-31014
HSIEH, C. C. N84-30356
HSU, C. F. N84-30620
HSU, J. Y. N84-30993
HU, H. N84-30020
HUANG, F. H. N84-30034
HUAZI, Y. N84-30067
HUBBARTT, J. N84-29853
HUBBELL, M. G. N84-29945
HUDGENS, C. R. N84-30204
HUDSON, T. E. N84-29912
HUERTA, M. A. N84-30232
HUFF, F. A. N84-30620
HUGGETT, G. J. N84-30950
HUIGIN, X. N84-30070
HUIJBREGTS, W. M. M. N84-30060
HUISMAN, W. C. N84-30791
HULING, G. N84-30755
HULME, B. L. N84-30842
HUMPHRY, F. J. N84-30163
HUNGERFORD, R. D. N84-30615
HUNTER, K. C. N84-30605
HUPP, J. T. N84-29984
N84-29985
HURTUBISE, R. J. N84-31022
HWANG, D. L. S. Q. N84-30086
HYDE, R. A. N84-31071
HYMAN, E. N84-30572
HYMAN, E. A. N84-30548

I

IDE, R. F. N84-29870
IGATA, N. N84-30053
ILIN, Y. A. N84-30652
IMHOFF, M. L. N84-30401
N84-30407
IMRE, K. N84-31002
INDOVINA, P. L. N84-30693
INGANAES, O. N84-30093
INGE, T. B. N84-30562
INGEBO, R. D. N84-30223
INOMATA, K. N84-30115
IPSEN, I. C. F. N84-30817
IRADJPANAH, K. N84-30257
IRONS, J. R. N84-30384
N84-30410
N84-30418
ISAACS, H. N84-30031
ISHIKAWA, Y. N84-30031
ISKANDER, M. F. N84-30670
ISMAIL, S. N84-30009
ITO, K. N84-30818
ITOH, T. N84-30189
IVANOV, B. Y. N84-30881
IVANOV, S. A. N84-30888
IVANOV, V. V. N84-30880
IVCHENKO, Y. L. N84-30870
IYER, R. N84-30234
IZUTSU, N. N84-30118

J

JACKSON, A. G. N84-30017
JACKSON, A. J. N84-30601
JACKSON, D. N84-30383
JACKSON, M. J. N84-30428
JACOBS, C. L. N84-30950
JACOBS, S. D. N84-30960
JAEGER, J. N84-30209
JAHODA, F. C. N84-30990
JAIN, J. L. N84-30850
JAIN, M. L. N84-30304
JAMES, M. B. N84-30907
JAMESON, R. A. N84-30911
JANG, S. W. N84-29958
JARBOE, T. R. N84-30984
N84-30985
N84-30986
N84-30987
JARLSKOG, C. N84-30940
JASPERS, R. N84-30712
JENDREZJCZYK, J. A. N84-30237
JENKINS, T. M. N84-30924
JENNINGS, S. G. N84-30597
JENREJCZYK, J. A. N84-30240
JENSEN, T. H. N84-30841
JING-TONG, J. N84-30499
JOESTLEIN, H. N84-30902
JOHANNESEN, R. B. N84-30100
JOHNSON, A. B. N84-31055
JOHNSON, B. M. N84-30928
JOHNSON, J. H. N84-29882
JOHNSON, P. M. N84-30922
JOHNSON, R. R. N84-30269
N84-30276
JOHNSON, T. L. N84-30775
JOHNSTON, N. J. N84-29973
JOHNSTON, S. N84-30273
JONES, K. W. N84-30928
JONES, L. A. N84-30194
JONES, O. D. N84-30390
JONES, R. B. N84-30081
JONES, S. M. N84-30560
JONES, W. B. N84-30046
JOSHI, C. N84-30992
N84-31004
JOST, G. S. N84-30333
JOSWIG, H. N84-30935
JOYCE, J. A. N84-30023
JUDD, D. C. N84-29933
JUNEAU, G. P. N84-29952
JUNKINS, R. N84-30719
JURAVIC, F. E., JR. N84-30265
JUSTICE, C. N84-30379

K

KABA, S. A. N84-30358
KAFADAR, K. N84-30829
KAHAN, A. N84-31013
KAHLER, R. C. N84-30159
KAHN, W. D. N84-30455
N84-30473
KAILASANATH, K. N84-30228
N84-30230
KAILATH, T. N84-30776
KAISER, T. B. N84-31003
KALANDAROV, S. N84-30658
KALASHNIKOV, M. P. N84-30881
KALKER, J. J. N84-30793
KAMEDA, J. N84-30054
KAMINSKIY, A. A. N84-30875
KAMO, R. N84-30111
KANEMASU, E. T. N84-30440
KANIA, D. R. N84-30194
KANNE, W. R., JR. N84-30313
KARPENKO, A. G. N84-30873
KARPLUS, H. B. N84-30262
KASIRAJ, P. N84-30056
KASTNER, C. J. N84-30383
KASZA, K. E. N84-30236
KATKOV, V. Y. N84-30660
N84-30662
KATUNTSEV, V. P. N84-30644
N84-30653
KATYUKHIN, L. N. N84-30651
KAWAHARA, W. A. N84-30036
KAYDALOV, O. V. N84-30488
KAZA, K. R. V. N84-30329
KAZAKOVA, R. T. N84-30653
KEEFE, D. N84-30912
KELLER, W. C. N84-30691
KELLOGG, G. L. N84-30007
KELLY, G. M. N84-29901
KELSALL, T. N84-31069
KELSEY, P. V., JR. N84-30092
KENDIG, M. W. N84-30021
KENNEDY, J. H. N84-30003
KERN, E. A. N84-29921
KERNER, W. N84-30961
KETCHEN, H. G. N84-30156
KHEYMETS, G. I. N84-30644
KHIFETS, S. N84-30209
KIDD, R. B. N84-30950
KIEFFER, H. H. N84-30389
KIM, B. S. N84-30074
KIM, C. H. N84-30912
KIM, J. S. N84-30841
KIM, K. M. N84-31019
KIMMER, E. N84-30409

KINDEL, J. M. N84-30992
KING, R. B. N84-30171
KING, R. J. N84-30164
KING, W. E. N84-30049
KINNEY, J. H. N84-31018
KINO, G. S. N84-30259
KIRBY, F. M. N84-29914
N84-29926
KITTEL, P. N84-30226
KLEIN, M. B. N84-30951
KLEMAS, V. N84-30419
N84-30424
KLEMETSON, R. W. N84-29932
N84-29935
KLEMOLA, A. N84-31068
KLIMENKO, I. S. N84-30882
KLINGNER, P. L. N84-30986
KLYNNING, L. N84-30009
KNIZE, R. J. N84-30044
KNORR, G. E. N84-30988
KNOX, S. O. N84-30986
KOBAKHIDZE, K. Z. N84-30864
KOBAYASHI, H. N84-30119
KOBLINSKY, C. J. N84-30469
KOCH, C. C. N84-30038
KOENIG, G. N84-30503
KOGUT, J. N84-30395
KOHLHASE, A. N84-30936
KOHYAMA, A. N84-30053
KOJIMA, K. N84-30127
KOK, J. N84-30705
N84-30706
N84-30792
KOLDAYEV, V. M. N84-30682
KOLENKIEWICZ, R. N84-30458
N84-30459
KOLODZIEJ, W. J. N84-30823
N84-30826
KOLOGRIVOV, A. A. N84-30879
KOLOKOCHIKOV, N. P. N84-30872
KOLPAKOVA, N. F. N84-30650
KOLSKY, H. N84-30339
KOMYSMEV, V. P. N84-30220
KONITZER, D. G. N84-30048
KOOPMAN, R. P. N84-30104
KOPANEV, V. I. N84-30654
KOPHSTAHL, E. N84-30500
KOPKA, J. N84-30588
KORBIN, C. M. N84-30778
KORELLIS, J. S. N84-30036
KOSTROMIN, S. G. N84-30868
KOT, C. A. N84-30243
KOTSCHENREUTHER, M. N84-30859
KOTTLER, R. J., JR. N84-30542
KOVALCHUK, Y. V. N84-30866
KRAMER, I. R. N84-30018
KRAMER, S. D. N84-30006
KRASILNIKOVA, T. N. N84-30222
KRAYNIK, A. M. N84-30261
KRAZINSKI, J. L. N84-30304
KRISHNA, C. M. N84-30801
KRUGLOV, B. V. N84-30881
KUBAN, D. P. N84-30296
KUBENDRAN, L. R. N84-29853
KUCHINSKIY, A. G. N84-30880
KUKACKA, L. E. N84-29979
KULKARNI, S. B. N84-29949
KUNZ, A. B. N84-29993
KUNZ, J. N84-30947
KUO, J. C. W. N84-30108
KUPERMAN, W. A. N84-30890
KUPERSHMIDT, B. A. N84-30973
KURAYEV, A. A. N84-30876
KURIHARA, M. N84-30124
KURSTEN, G. D. N84-30675
KUSTOM, R. L. N84-30193
N84-30906
KUWABARA, S. N84-30116
KUZMIN, P. N. N84-30483
KUZNETSOV, A. N. N84-30679
KUZNETSOVA, T. I. N84-30658

L

LAMB, T. E. N84-30522
LAMBERT, B. F. N84-30522
LAMOREAUX, R. H. N84-30537
LAMPERT, C. M. N84-31029
LANCE, R. J. N84-29965
LANDIS, D. A. N84-30266
LANDRY, M. J. N84-30199
LANE, D. S. N84-30755
LANG, H. R. N84-30413
LANSING, J. C. N84-30376
LARDUINAT, E. N84-30395
LARSEN, J. C. N84-30566
LARSSON, P. G. N84-30061
LASER, D. N84-31010
LATHROP, R. H. N84-30299
LATSKEVICH, A. A. N84-30648
LATTY, R. S. N84-30410
N84-30418
LAUCHLE, G. C. N84-30229
N84-30893
LAUER, D. T. N84-30421
LAUGHLIN, R. B. N84-31023
LAURENT, J. N84-30565
LAW, C. K. N84-29963
LAY, H. G. N84-30501
LAY, P. A. N84-29987
LAZERENKO, N. A. N84-30682
LEAN, J. L. N84-31070
LEAVITT, R. P. N84-31015
LEBEDA, C. F. N84-30583
LEBEDEV, V. I. N84-30652
LEBRUN, M. N84-30731
LEE, A. N84-29963
LEE, C. S. N84-30145
LEE, J. K. N84-30976
LEE, K. N84-30582
LEE, P. H. Y. N84-30263
N84-30269
LEE, S. C. N84-30585
LEE, S. W. N84-30145
LEETE, T. N84-30079
LEIGH, R. W. N84-29995
LEMAITRE, M. P. N84-30565
LENGYEL-FREY, D. N84-31079
LENZ, T. G. N84-30234
LEONARD, D. S. N84-30301
LEONARDO, M. N84-29875
LEONTARITIS, I. J. N84-30844
N84-30845
LEOVY, C. B. N84-30447
LERCH, F. J. N84-30466
LETTY, D. F. N84-30521
LEUNG, K. C. N84-30366
N84-30373
LEUNG, K. N. N84-30201
N84-30918
LEV-ARI, H. N84-30802
LEVAN, N. N84-30832
LEWIS, G. W. N84-30697
LEWIS, P. A. W. N84-30632
LI, F. Z. N84-30350
LI, S. N84-30000
LI, T. T. T. N84-29986
N84-29990
LIANG, F. N84-29960
LICHTENBERG, D. B. N84-30903
LIEBERMAN, H. N84-30809
LIKENS, W. C. N84-30408
LIND, R. C. N84-30951
LINDQVIST, E. N84-30899
LIPPENS, C. N84-30565
LIU, C. T. N84-30038
LIU, H. S. N84-30460
LIU, H. Y. N84-29985
LIVINGSTON, R. C. N84-30573
LLEWELLYN, B. M. N84-30691
LLIBRE, J. N84-29896
LLOYD, B. N84-30981
LO, Y. T. N84-30145
LOBACHEVSKIY, L. A. N84-30873
LOBACHIK, V. I. N84-30646
LODA, R. T. N84-29882
LOEF, G. O. G. N84-30234
LOEW, G. A. N84-30913
LOGAN, T. L. N84-30392
LOKEN, G. R. N84-29965
LOKTEV, V. M. N84-30884
LOMBAERS, J. N84-30315
LOOMIS, B. N84-30053
LOPEZ, O. F. N84-29970
LOPEZ, R. E. N84-30623
LORD, R. E. N84-30310
LORENZ, J. H. N84-30084
LOTSPIECH, J. B. N84-30370
LOUI, M. C. N84-30825
LOVBERG, R. H. N84-29930
LOWNEY, J. R. N84-31016
LOWRY, K. A. N84-30775
LOZANO, F. N84-30381
LU, S. C. N84-30344
LU, Y. C. N84-30431
N84-30432
LUBKOWITZ, R. N84-30502
LUCHININ, A. G. N84-30494
LUNDSTROEM, I. N84-30093
LJNDSTROM, N. H. N84-29946
LUNINA, N. V. N84-30661
LUOBAO, W. N84-30064
LUSK, E. L. N84-30726
LUSTIN, S. I. N84-30654
LYDEN, J. D. N84-30633
LYON, J. C. N84-30369
LYTLE, R. J. N84-30164
LYUBIN, V. M. N84-30867

M

MACDONALD, D. D. N84-30050
MACDONALD, R. B. N84-30415
MACKENZIE, F. D. N84-30624
N84-30625
MACPHERSON, G. L. N84-30578
MACPHERSON, J. I. N84-29855
MACROBERTS, M. D. J. N84-30200
MAGNUSON, R. H. N84-29987
MAHADEVAN, P. N84-29922
MAHIN, S. A. N84-30358
MAJUMDAR, S. N84-30971
MAKAROV, N. A. N84-30488
MAKSIMOV, D. G. N84-30644
MALARET, E. N84-30381
N84-30394
MALILA, W. A. N84-30386
N84-30403
MALIN, M. R. N84-30255
N84-30256
MALLEY, J. O. N84-30136
MALON, D. M. N84-30786
MALONE, G. A. N84-30013
MALOV, S. N. N84-30862
MAMONTOVA, T. N. N84-30871
MANDERS, W. F. N84-30100
MANNING, S. D. N84-29865
N84-29866
MANSER, G. E. N84-29947
N84-30061
MANSFELD, A. D. N84-30053
MANSFELD, F. B. N84-30021
MARCELL, R. F. N84-30431
MARCELL, R. M. N84-30430
MARCHANT, D. D. N84-30065
MARCHETTI, A. N84-30693
MARGOLIN, L. G. N84-30349
MARIKHIN, V. A. N84-30871
MARKHAM, B. L. N84-30372
N84-30402
N84-30410
N84-30418
N84-30423
MARKLIN, G. N84-30975
MARKSON, R. N84-30598
MARMAR, E. N84-30969
MARSDEN, J. E. N84-30972
MARSH, J. G. N84-30470
MARSHALL, N. H. N84-30787
MARSHALL, W. J. N84-30688
MARTIN, A. J. N84-30088
MARTIN, B. J. N84-30160
MARTIN, C. N84-30774
MARTIN, E. C. N84-29961
MARTIN, H. N84-30009
MARTIN, H. L. N84-30303
MARTIN, J. A. N84-29915
MARTIN, V. J. N84-29889
MARTINEZ, R. N84-29896
MARYSKO, M. N84-30869
MASHIKO, K. N84-30126
MASLOVA, M. N. N84-30651
MASON, R. N84-30695
MASTERSON, K. N84-30535
MATHER, J. C. N84-31069
MATHEWS, L. A. N84-29882
MATHIS, M. G. N84-31009
MATTES, H. N84-30304
MATTHECK, C. N84-30325
MAYER, V. I. N84-30486
MAYVILLE, R. N84-30258
MAZOUR, T. J. N84-30156
MCADOO, D. C. N84-30463
MCBREEN, J. N84-30191
N84-30192
N84-30196
MCCARTHY, J. L. N84-30783
MCCONNELL, J. G. N84-29901
MCCOOL, J. I. N84-30311
MCCORMICK, T. J. N84-29929
MCGARY, M. C. N84-29977
MCGILLEM, C. D. N84-30381
N84-30394
MCGOLDRICK, L. N84-30444
MCGREGOR, B. A. N84-30639
N84-30640
N84-30641

MCGUIGAN, D. L. N84-30288
MCHARGUE, C. J. N84-30052
MCINTIRE, H. D. N84-30955
MCINTOSH, G. E. N84-29888
MCINTYRE, R. G. N84-29942
MCKENNA, K. F. N84-30854
MCKEON, T. J. N84-30250
MCKEVITT, F. X. N84-29911
MCKINLEY, J. M. N84-30819
MCLENDON, J. T. N84-30172
MCMAHON, H. N84-29853
MCNEILLY, D. R. N84-30857
MCPEAK, A. W. N84-29913
MCRAE, T. G. N84-30104
N84-30267

MEAGHER, G. M. N84-29913
MECOZZI, D. T. N84-30805
MEDECKI, H. N84-30283
MEEK, T. T. N84-30295
MEHL, W. N84-30379
MEHLBREUER, A. N84-30503
MEHROTRA, A. K. N84-29954
N84-29956

MELACK, J. M. N84-30436
MELENDEZ, R. E. N84-30909
MELHEM, R. G. N84-30830
MELLOTT, M. M. N84-30582
MELNGAILIS, J. N84-30953
MENDES, R. V. N84-30846
MENKE, K. N84-30504
MENSHCHIKOV, A. P. N84-30649
MENZEL, W. P. N84-30571
MERON, M. N84-30928
MERRIGAN, M. A. N84-30248
MERTZ, F. C. N84-30396
METZ, P. D. N84-29995
METZLER, M. D. N84-30386
MEURISCH, H. N84-30505
MEZGA, L. J. N84-30944
MICHAEL, G. A. N84-30727
MICHALEK, K. N84-29995
MIDDLETON, E. M. N84-30432
MIGLIORI, A. N84-30895
MIGULIN, V. V. N84-30873
MIKESKA, A. J. N84-29950
MIKHAYLOV, Y. A. N84-30881
MIKKOLA, R. D. N84-30057
MIL, Y. M. N84-30880
MILES, R. B. N84-29994
MILLER, E. F. N84-30146
MILLER, E. K. N84-30162
N84-30164

MILLER, H. M. N84-30959
MILLER, J. S. N84-30554
MILLER, R. H. N84-30907
MILLER, R. S. N84-29963
MILLER, W. J. N84-30177
MILLIGAN, J. M. N84-30526
MILLIGAN, R., JR. N84-30129
MILLIS, R. L. N84-31086
MIMMS, D. L. N84-30390
MINARDI, J. E. N84-29856
MING, E. G. N84-30523
MINGGAO, Y. N84-30071
MINTEN, A. N84-30907
MINTON, J. A. N84-30805
MISHRA, I. B. N84-29952
N84-29954
N84-29956

MITCHELL, A. M. N84-30293
MITCHELL, T. B. N84-30152
MITCHELL, W., III N84-30946
MITSEL, A. A. N84-30493
MITTL, J. C. N84-30092
MIYAKE, C. I. N84-29911
MIYOSHI, K. N84-30072
MIZOGUCHI, A. N84-30175
MOCHIZUKI, M. N84-30126
MODIN, A. Y. N84-30646
MOGUTOV, S. S. N84-30655
MOHANTY, S. G. N84-30850
MOHLER, J. H. N84-29999
MOHLER, R. R. N84-30823
N84-30826

MOHNEN, V. N84-30441
MOHTAI, T. N84-30126
N84-30127

MOKHOV, I. I. N84-30490
MOKUANG, K. N84-30065
MOOK, H. A. N84-30904
MOONEY, J. B. N84-30537
MOORE, B., III N84-30435
MOORE, M. L. N84-29946
MOORE, R. K. N84-30148
MOORE, R. W. N84-30976
MORAN, C. M. N84-29920
MORAWIETZ, P. N84-30325
MORI, W. B. N84-30992
MORIARTY, R. M. N84-29963
MORITA, A. N84-30175
MORRIS, J. W., JR. N84-30027
MORRISON, C. A. N84-31015
MORRISON, P. J. N84-30859
N84-30972

MORSINK, G. N84-30711
MOSELEY, V. A. N84-29936
MOSHER, C. H. N84-29921
MOSHER, D. N84-30179
MOSHER, M. N84-30867
MOSS, R. W. N84-30030
MOY, L. N84-30533
MOZER, M. C. N84-31050
MUELLER, H. N84-30555
MUENNICHOW, I. N84-30760
MUGGE, M. N84-30921
MUKHERJEE, S. B. N84-30327
MUKUNDA, N. N84-30839
MULLEN, M. W. N84-31051
MULLER, C. N84-30565
MUNIR, Z. A. N84-30059
N84-30089
N84-31018

MUNJAL, A. K. N84-29949
MUNOZ-CANDELARIO, R. N84-29996
MUNTZ, J. E. N84-31053
MURAKAMI, M. N84-31006
MURCRAY, D. G. N84-30566
MURCRAY, F. J. N84-30566
MURPHY, C. J. N84-30081
MURPHY, H. D. N84-30539
MURPHY, J. N84-30378
N84-30404

MURPHY, L. M. N84-30543
MURTHY, S. N. B. N84-29875
MUSSON, T. A. N84-30322
MYERS, D. C. N84-30696
MYERS, L. T. N84-30724
MYRA, J. R. N84-30999

N

NACINI, E. N84-30512
NACKUNSTZ, I. N84-30506
NAKAI, H. N84-31008
NAKAMOTO, T. N84-30124
NAKANIWA, N. N84-31008
NAKAYAMA, H. N84-30124
NANAYAKKARA, M. A. N84-30353
NARAMOTO, H. N84-30052
NARAYAN, J. N84-30052
NASH, T. J. N84-30932
NATESAN, K. N84-30039
N84-30043

NAUJOKAS, G. J. N84-29938
NEALE, P. T. N84-30143
NEBUCHINOV, M. V. N84-30864
NEDOSPASOV, A. V. N84-30877
NEEDLEMAN, A. N84-30350
NEEMAN, E. N84-30609
NEFEDOV, Y. I. N84-30876
NEFF, W. A. N84-30057
NEGISHI, K. N84-30122
NEILSON, R. M., JR. N84-30092
NELSON, C. N84-30094
NELSON, P. A. N84-30190
NELSON, R. F. N84-30410
NELSON, W. R. N84-30924
NETZ, A. A. N84-30055
NEUBERGER, A. W. N84-30252
NEUFFER, D. V. N84-30280
NEUGENT, W. N84-30736
NEUMAN, S. P. N84-30527
NEVRZIVA, M. N84-30869
NEWCOMB, M. N84-29966
NEWMAN, F. M. N84-30076
NEWMAN, H. J. N84-30307
NEWMAN, J. N84-30210
NEWMAN, J. A. N84-29992
NEWMAN, J. C., JR. N84-30330
NEWMAN, M. N84-30197
NEWNAM, B. E. N84-30279
NEWTON, L. E. N84-30113
NICHOLSON, D. R. N84-30576
N84-30988

NICOLET, M. N84-30564
NIILER, A. N84-30079
NIKITIN, V. A. N84-30871
NIKOLAYEV, V. P. N84-30653
NIKONOVA, F. I. N84-30486
NISHIDA, M. N84-30119
NISHIHARA, H. K. N84-30686
NOBACK, R. N84-29886
NOBLE, D. C. N84-30587
NOEL, M. J. N84-30950
NOLD, J. N84-30890
NOVIKOV, V. Y. N84-30652
NOVOSELTSEV, V. N. N84-30676
NOWAK, D. N84-30217
N84-30218
N84-30219
N84-30550

NUSSBAUM, N. S. N84-29894
NYE, R. N84-31066

O

OBRIEN, D. W. N84-30720
OBRIEN, M. J. N84-30188
OBRIEN, T. K. N84-29972
OBUKHOVA, M. V. N84-30644
OCKERT, C. E. N84-30243
N84-30345

OEZBEK, A. N84-30155
OGAWA, R. N84-30027
OGDEN, J. S. N84-30941
OGG, G. M. N84-29928
OGILVIE, K. W. N84-30962
OHLSSON, H. N84-31058
OHTA, N. N84-30843
OHYABU, N. N84-30976
OKEEFE, T. J. N84-30062
OLSON, J. M. N84-30090
OLSON, R. E. N84-30606
OMLOR, R. E. N84-30017
OOSTERKAMP, W. J. N84-30352
OPHOFF, W. N84-30507
ORAN, E. S. N84-30230
ORAS, J. J. N84-30236
ORAV, E. J. N84-30632
ORKILD, P. P. N84-30584
ORSINI, A. N84-29924
OSBORN, W. N84-31066
OSETROV, V. P. N84-30881
OSHIMA, K. N84-30114
OSHIMA, Y. N84-30118
OSHIRO, M. N84-30124
OSLUND, J. E. N84-29907
OSTROVSKIY, V. S. N84-30884
OVERBEEK, R. A. N84-30728
OWENS, D. H. N84-30134
N84-30733
N84-30852

OWENS, W. W. N84-30057
OWETE, O. S. N84-30246

P

PALMER, J. M. N84-30383
PANOFSKY, T. N84-30731
PAPAYAN, G. V. N84-30883
PARASHIN, L. B. N84-30646
PARISH, S. N84-30756
PARISI, G. N84-30937
N84-30938

PARKS, E. J. N84-30100
PARKS, R. D. N84-31020
PAS, I. A. N84-30656
PASCHOS, E. A. N84-30939
PASTRNAK, J. W. N84-30779
PATE, J. E. N84-31053
PAVERMAN, V. S. N84-30964
PAVLOVSKIY, A. I. N84-30872
PAYLOR, E. D. N84-30413
PAYNE, G. L. N84-30576
PEARSON-SMITH, J. M. N84-30336
PECORELLA, W. N84-30169
PEIRCE, D. N84-30258
PELLIZZARI, E. D. N84-30012
PELOQUIN, R. A. N84-30730
PENZIEN, J. N84-30137
PEREIRA, A. N84-30009
PERKINS, G. S. N84-30296
PETERSEN, E. L. N84-30724
PETERSON, N. L. N84-30049
N84-31025

PETRILLO, L. N84-30169
PETRUSENKO, A. N. N84-30649
PETTITT, A. N. N84-30324
PHILLIPS, R. J. N84-30443
PHILLIPS, W. E. N84-31016
PICOLOGLOU, P. N84-30971
PIERCE, A. D. N84-30630
PIETRAFESA, L. J. N84-30635
PIETRZYK, Z. A. N84-30286
PIKE, C. N84-30912

PIKUS, G. Y. N84-30870
PINCOSY, P. A. N84-30201
PING, W. N84-30065
PIRUZYAN, L. A. N84-30679
PITMAN, S. G. N84-30058
PITTMAN, W. E., JR. N84-30172
PITTS, D. E. N84-30415
N84-30427
PITZ, W. J. N84-30312
PLATTS, D. A. N84-30986
PLEASANT, L. G. N84-30664
PODWYSOCKI, M. H. N84-30390
POE, C. C., JR. N84-29974
POGORELSKIY, Y. V. N84-30866
POLCAROVA, M. N84-30869
POLTAVSKIY, A. F. N84-30661
PONGRATZ, M. B. N84-30583
PONOMAREV, Y. N. N84-30493
POOCK, G. K. N84-30160
POPOV, E. P. N84-30136
N84-30343
N84-30355
POPOV, I. G. N84-30648
PORKOLAB, M. N84-30981
N84-30982
PORTER, J. E. N84-30522
PORTER, R. S. N84-30074
N84-30075
PORTNYAGIN, Y. I. N84-30488
POTTER, J. M. N84-30163
N84-30336
POTTS, M. J. N84-30135
POWELL, C. A. N84-29977
POWELL, P. N84-30178
POWERS, L. V. N84-30276
POZHARSKIY, G. O. N84-30659
PRAEG, W. F. N84-30856
PRAGER, S. C. N84-30998
PRATER, J. T. N84-30030
PRATER, R. N84-30993
PRATT, S. T. N84-30917
N84-30925
PRAVOSUKOV, V. P. N84-30647
PREPARATA, F. P. N84-30723
N84-30824
PRICE, J. C. N84-30420
PRIKHOTKO, A. F. N84-30884
PRIOR, H. L. N84-30422
PROCTOR, J. G. N84-29887
PRONK, G. N84-30710
PROVOOST, G. A. N84-30254
PRUTKIN, I. L. N84-30486
PUGA, L. C. N84-31070
PUGH, P. F. N84-30195
PULLE, D. W. J. N84-30216
PURCELL, J. N84-30304
PURSER, F. O. N84-30163
PUTNEY, B. H. N84-30467

Q

QUATTROCHI, D. A. N84-30414
QUEST, K. B. N84-30582
QUINTIERS, J. G. N84-30011

R

RAAEN, S. N84-31020
RABITZ, H. N84-29994
RAGLAND, K. W. N84-30556
RAI, D. N84-30557
RAINE, G. P. N84-30930
RAJU, I. S. N84-30330
RAKSHNYA, S. E. N84-30482
RALSTON, D. R. N84-30517
RAMACHANDRA, S. M. N84-30224
RANELLETTI, J. E. N84-30727
RANGO, A. N84-30434
RAPTIS, A. C. N84-30260
RASOOL, S. I. N84-30385
RAU, C. A., JR. N84-29881
RAZA, A. D. N84-30800
REDDY, J. F. N84-30049
REED, J. E. N84-29967
REF, D. J. N84-30854
REID, M. A. N84-30528
REITER, R. N84-30555
REMICK, R. J. N84-30531
REPOFF, T. P. N84-31070
RESUNER, P. N84-30334
REYMAN, A. M. N84-30653
REYNA, E. N84-30415
REYNOLDS, G. O. N84-30258
REYNOLDS, H. M. N84-29955
RICE, D. R. N84-30403
RICH, J. W. N84-29991
RICHMAN, M. S. N84-30754
RICHTER, G. P. N84-29870
RICKENBAUGH, D. E. N84-29954
RIDDLE, J. R. N84-30684
RIEGLE, N. N. N84-31062
RIGDON, G. G. N84-30616
N84-30617
RIKS, E. N84-30351
RINSLAND, C. P. N84-30566
RIORDAN, G. A. N84-30001
RITCHIE, J. C. N84-30425
RITCHIE, R. O. N84-30024
N84-30202
RIZK, Y. M. N84-30225
ROBBINS, C. L. N84-30605
ROBERGE, R. N84-30032
ROBERTO, J. B. N84-31006
ROBERTS, E. O. N84-29944
ROBERTSHAW, G. A. N84-30154
ROBIN, G. D. N84-30445
ROBINSON, B. A. N84-30580
ROBINSON, D. W. N84-30694
ROBINSON, R. M. N84-30573
ROBSON, A. E. N84-30980
ROCK, K. N84-31075
ROCKETT, P. D. N84-30974
ROESLER, L. N84-29867
ROGALLA, K. N84-30549
ROGERS, J. E. N84-30557
ROGERS, S. C. N84-30897
ROHRS, C. E. N84-30808
ROLLINS, H. C. N84-30523
RONGZHANG, C. N84-30064
ROSEBLADE, R. J. N84-30332
ROSEN, I. G. N84-29903
ROSEN, S. P. N84-31072
ROSENBERG, S. D. N84-29933
ROSENBERG, W. J. N84-30151
ROSENBLUM, S. S. N84-30912
ROSENZWEIG, M. S. N84-30560
ROTH, J. N84-31006
ROTHGARY, E. N84-29954
ROTHWELL, P. L. N84-30574
ROUSE, M. N84-29976
ROUSSOS, L. A. N84-29977
ROWLEY, R. W. N84-29919
ROYEN, P. N84-30009
RUBIN, J. N84-30731
RUBINCAM, D. P. N84-30464
N84-30465
RUDD, D. N84-30752
RUDMIK, A. N84-30756
RUDOLPH, L. K. N84-29928
RUDYAYEV, F. I. N84-30487
RUEGSEGGER, T. N84-30766
RUITENBEEK, K. N84-30714
RUMYANTSEV, V. V. N84-30660
N84-30662
RUNDELL, D. N. N84-30251
RUOXI, C. N84-30069
RUPASOV, A. A. N84-30878
RUPASOV, A. S. N84-30879
RUSH, H. F. N84-30014
RUSSELL, D. L. N84-30812
RUSSO, A. J. N84-30306
N84-30778
RUTHBERG, Z. G. N84-30736
RUTSAY, S. V. N84-30677
RYABUKHO, V. P. N84-30882
RYAN, J. W. N84-30459
RYDER, J. T. N84-29978
RYGWELSKI, K. R. N84-30525

S

SACKHEIM, R. L. N84-29918
SADLER, R. F. N84-29941
SADOWSKI, F. G. N84-30421
SALAMAN, R. K. N84-31060
SALAZAR, S. N84-30739
SALHI, H. N84-30821
SALISBURY, J. W. N84-30390
SALMON, Y. L. N84-30669
SANCHEZ, B. V. N84-30471
SANDFORD, M. T., II N84-30245
SARDALOS, S. L. N84-30785
SARGENT, W. H. N84-29945
SARGENT, W. S. N84-30140
SARPKAYA, T. N84-30233
SARRAFIAN, S. K. N84-29885
SAUERS, I. N84-30212
SAULGOZIS, Y. Z. N84-30652
SAVAGE, R. K. N84-30383
SAVCHENKO, V. M. N84-30880
SAWCHUK, A. A. N84-30956
SCHAEFER, R. J. N84-30251
SCHEARER, L. D. N84-30016
SCHEMMER, F. M. N84-30696
SCHIEBE, F. R. N84-30425
SCHLIETER, J. A. N84-30615
SCHMELZLE, J. N84-30549
SCHMID, A. W. N84-30960
SCHMIDT, F. A. N84-30037
SCHMIDT, P. P. N84-29981
N84-29982
N84-29983
N84-30819
SCHMIDT, R. L. N84-30557
SCHNEIBEL, J. H. N84-30028
SCHNEIDER, H. N84-30708
SCHNOOF, C. N84-30334
SCHOCH, L. B. N84-30400
SCHOENEMAN, B. D. N84-30036
SCHOENMAN, L. N84-29934
SCHOFIELD, J. N84-30603
SCHOTT, J. R. N84-30375
SCHOWENGERDT, R. N84-30388
SCHRING, J. E. N84-29954
SCHROEDER, R. J. N84-30276
SCHUBERT, W. H. N84-30596
SCHULTHEISS, P. J. N84-30950
SCHULTZE, D. N84-30875
SCHUSS, J. J. N84-30981
SCHWAB, A. P. N84-30557
SCHWARZ, R. B. N84-30056
SCHWEIN, T. F. N84-30603
SCHWUTTKE, G. H. N84-31019
SCIRE, F. E. N84-30319
SCOTT, D. D. N84-30348
SCOTT, J. S. N84-31068
SCOTT, R. W. N84-30620
SCRIBNER, K. J. N84-30107
SEAGRAVES, P. N84-31075
SEARLE, R. C. N84-30950
SEDBERRY, F. C. N84-30523
SEEVERS, P. M. N84-30421
SEKA, W. N84-31001
SEKHON, R. S. N84-30432
SELKOWITZ, S. N84-30609
SELLECK, C. B. N84-30834
SELPH, C. C. N84-29938
SENNEWALD, P. F. N84-29840
SEPANIAK, M. J. N84-30291
SERCEL, J. C. N84 29935
SERGEYEVA, Y. S. N84-30655
SERVAES, D. A. N84-30258
SETHIAN, J. A. N84-30004
SEVERI, M. N84-30169
SEVERIN, A. Y. N84-30656
SEVESTRE, C. N84-29850
SFORZA, P. M. N84-30530
SHA, W. C. N84-30238
SHAFER, M. F. N84-29884
SHAN, T. J. N84-30776
SHAOGING, Z. N84-30066
SHAPIRO, A. B. N84-30247
SHAPIRO, P. N84-30724
SHARMAN, P. W. N84-30353
SHARPE, W. N., JR. N84-30341
SHASHKOV, V. S. N84-30646
SHEA, R. F. N84-30914
SHEEN, S. H. N84-30260
SHEERIN, J. P. N84-30576
SHEETS, R. C. N84-30619
SHEFFIELD, C. A. N84-30412
SHEFFIELD, R. L. N84-30278
SHEINBERG, H. N84-30040
SHELTON, E. M. N84-30106
SHELTON, R. T. N84-30288
SHEN, C. N. N84-30828
SHEN, Y. R. N84-30958
SHEPARD, C. L. N84-30269
N84-30276
SHEPHER, J. R. N84-30002
SHEPHERD, R. N84-30974
SHEPPARD, J. C. N84-30907
SHER, A. N84-31010
SHERIDAN, T. B. N84-30717
SHERMAN, M. P. N84-29997
SHERWOOD, A. R. N84-30984
N84-30986
SHERWOOD, E. G. N84-30854
SHIBAYEV, V. P. N84-30868
SHIH, C. F. N84-30350
SHIKANOV, A. S. N84-30878
N84-30879
SHIMAMOTO, F. Y. N84-30113
SHIMIZU, A. N84-30123
SHIMOTAKE, H. N84-30190

SHIN, K. G. N84-30801
SHIN, Y. W. N84-30243
N84-30345
SHINOZUKA, M. N84-29865
N84-29866
SHIRSHOV, P. P. N84-30483
SHIVER, A. W. N84-30842
SHMYGLEVSKIY, Y. D. N84-30874
SHOLETTE, W. P. N84-30198
SHORT, L. O. N84-31035
SHORT, N. M. N84-30416
SHORT, R. N84-31001
SHORT, R. W. N84-31000
N84-31005
SHOU, J. K. N84-30251
SHUEN, J. S. N84-29877
SHUYUAN, L. N84-30070
SIEMER, D. D. N84-30263
SIEMON, R. E. N84-30854
SIENKO, M. J. N84-29992
SIEVERS, G. K. N84-29878
SIEWIOREK, D. P. N84-30777
SIGMAR, D. J. N84-30996
SILBERMAN, J. A. N84-31010
SILVER, P. N84-30695
SILVERBERG, R. F. N84-31069
SIM, A. G. N84-29863
SIMIU, E. N84-30139
SIMMONS, C. S. N84-30250
SIMO, C. N84-29896
SIMON, A. N84-31001
N84-31005
SIMONEN, F. A. N84-30323
SIMONS, D. J. N84-30583
SINGH, M. P. N84-30354
SINIFF, D. B. N84-30673
SIRE, R. N84-30334
SISSON, C. E. N84-30778
SKINNER, E. B. N84-29941
SKLIZKOV, G. V. N84-30678
N84-30679
SKORINOV, V. N. N84-30491
SKOTHEIM, T. A. N84-30093
SLADKOVIC, R. N84-30555
SLATER, P. N. N84-30383
SLEPYAN, A. Y. N84-30876
SLEPYAN, G. Y. N84-30876
SLONE, R. J. N84-30111
SMETANA, P. N84-31019
SMIRNOV, K. V. N84-30649
SMITH, B. W. N84-30349
SMITH, D. E. N84-30458
N84-30461
SMITH, D. J. N84-30960
SMITH, D. L. N84-30971
SMITH, G. R. N84-30991
SMITH, I. D. N84-29909
SMITH, M. J. T. N84-30150
SMITH, R. E. N84-30554
SMITH, S. N84-30766
N84-30774
SMITH, W. L. N84-30571
SMITH, W. W. N84-29931
SMOLSKIY, O. V. N84-30866
SMORTO, M. J. N84-30530
SNOW, D. B. N84-30019
SNYDER, G. N84-30749
SNYDER, H. L. N84-30716
SOBOL, W. W. N84-29959
SOBOLEVSKIY, V. I. N84-30647
SODJA, J. N84-30907
SOEDE, T. N84-30705
N84-30713
SOHAIL, S. A. N84-30181
SOKOLOV, I. A. N84-30866
SOKOLOV, N. S. N84-30870
SOLAND, R. M. N84-31034
SOLDATOVA, L. P. N84-30681
SOLOMON, A. S. P. N84-29877
SORENSEN, C. N84-30415
SPANNER, J. C. N84-30323
SPARREBOOM, D. N84-30714
SPAULDING, A. D. N84-30173
SPAULDING, W. G. N84-30610
SPEAKER, S. M. N84-29865
SPEARMAN, M. L. N84-29847
SPENCER, R. L. N84-30853
SPERLING, L. H. N84-30081
SPICER, W. E. N84-31010
SPINDEL, R. C. N84-30891
SPITZER, E. A. N84-30624
N84-30625
SPJELDVIK, W. N. N84-30574
SPROTT, J. C. N84-30998
SPYROU, S. M. N84-30212
SQUILLANTE, M. N84-30533
ST.JOHN, W. N84-30766
ST.MARTIN, J. N84-30156
STACEY, W. M., JR. N84-30996
STALLINGS, D. W. N84-29964
STAMM, H. N84-30326
STANFORD, J., JR. N84-30684
STARNES, J. H., JR. N84-29976
STARRETT, H. S. N84-29949
STASSEN, H. N84-30711
N84-30713
N84-30715
STASSEN, H. G. N84-30704
STAUFENBIEL, W. N84-30508
STAUFFER, M. L. N84-30410
N84-30418
STAVRINIDIS, C. N84-29904
STECHMAN, R. C. N84-29912
STECKLER, K. D. N84-30011
STEIN, B. A. N84-29968
STEIN, E. S. N84-30698
STEIN, G. N84-30808
STEYERT, W. A. N84-30300
STICKER, H. N84-30921
STIEFEL, S. W. N84-29859
STIER, M. T. N84-31069
STODT, J. A. N84-30579
STOLL, A. N84-30861
STONE, R. G. N84-31079
STRAND, T. C. N84-30956
STRANGE, K. L. N84-29906
N84-29939
STRUVE, K. W. N84-30909
STUBBE, P. N84-30588
STULEN, R. H. N84-30242
STURDEVANT, J. A. N84-30421
SU, J. N84-30409
SU, Y. L. D. N84-30700
SUBRAHMANYAM, K. B. N84-30329
SUDARSHAN, E. C. G. N84-30933
SUGAMA, T. N84-29979
SUGIHARA, R. N84-30965
SUGIHARA, S. N84-30125
SUMMERAUER, I. N84-30885
SUMMERS, M. A. N84-30282
SURESH, S. N84-30202
SURKOVA, I. S. N84-30677
SUTER, P. N84-29880
N84-30297
SUZUKI, A. N84-30125
SVENSON, F. C. N84-29908
SWARTZ, K. N84-31000
SWEENEY, J. J. N84-30581
SWIFT, G. W. N84-30895
SWILLUM, M. N84-29964
SYAMLAL, M. N84-30128
SYMM, G. T. N84-30792
SYMONDS, P. S. N84-30339
SYRESIN, E. M. N84-30934
SZE, D. K. N84-30971
SZE, R. C. N84-30281
N84-30284

T

TADAYYONI, M. A. N84-29988
TAFT, J. L. N84-30524
TAGLAUER, E. N84-31006
TAI, T. C. N84-30231
TAKAGI, H. N84-30127
TAKAOKA, M. N84-30126
TAKASE, Y. N84-30981
TAKASU, S. N84-30124
TAKAYANAGI, K. N84-30568
TALBERT, S. N84-30051
TALLMAN, R. L. N84-30092
TALMAN, R. N84-30913
TANABE, H. N84-30174
TANAKA, K. N84-31001
TANEDA, K. N84-30124
TANG, F. N84-30069
TANGUAY, A. R., JR. N84-30956
TARLINI, M. N84-30839
TARVIN, J. A. N84-30276
TATSENKO, O. M. N84-30872
TAYLOR, G. D. N84-30596
TAYLOR, P. B. N84-29848
TAYLOR, R. P. N84-30227
TAYLOR, T. T. N84-30323
TEAGUE, E. C. N84-30319
TEGLAS, R. N84-30818
TELLE, J. M. N84-30285
TEMPS, F. N84-30010
TEOH, W. N84-29902
TESHIMA, K. N84-30120
TESTER, J. R. N84-30673
TESTER, J. W. N84-30539
N84-30580
TETZLAFF, G. N84-30549
TEXEL, P. P. N84-30747
N84-30753
TEXTER, S. N84-30981
THALL, R. M. N84-30748
THARP, H. S. N84-30822
THERRIEN, A. E. N84-30298
THIDE, B. N84-30588
THIJS, W. N84-30709
THOMAS, E. R. N84-29907
THOMAS, G. N84-30087
THOMAS, J. N84-29862
N84-30334
THOMPSON, D. R. N84-30427
THOMPSON, E. J. N84-30578
THOMPSON, G. L. N84-31036
THOMPSON, R. B. N84-30347
THOMPSON, R. E. N84-29957
THOMPSON, S. N84-31057
THOMSEN, M. F. N84-30582
THOMSON, K. D. N84-29900
THORMODSGARD, J. M. N84-30399
THORNTON, H. T., JR. N84-30335
THURBER, W. R. N84-31016
TICHY, J. N84-30886
TIEFENBACK, M. N84-30912
TIESZEN, S. R. N84-29997
TIEZHONG, T. N84-30067
TIFFANY, S. H. N84-29883
TIKHONCHUK, V. S. N84-30657
TILLY, D. M. N84-30789
N84-30835
TINGLEY, F. M. N84-30159
TITOV, G. A. N84-30491
TIWARI, S. N. N84-29851
TOKAR, M. Z. N84-30877
TOLESHOV, A. K. N84-30102
TOLL, D. L. N84-30410
N84-30429
TOLY, N. F. N84-30242
TOMANTSCHGER, K. N84-30550
TOMPKINS, F. G. N84-30737
TOWNSHEND, J. R. G. N84-30428
TRAINOR, R. J. N84-30289
TREMBLEY, N. N84-29881
TREVESE, D. N84-30382
TROWBRIDGE, C. N84-29953
TRUHAN, J. J. N84-30045
N84-30047
TRUHER, J. B. N84-30907
TSCHUDY, J. J., II N84-30744
TSINTSADZE, N. L. N84-30964
TSIRULSKIY, A. V. N84-30486
TSKHAKAYA, D. D. N84-30964
TSUCHIYA, T. N84-29875
TSUSHIMA, A. N84-30966
TURKEL, E. N84-29852
TURMAN, B. N. N84-30602
TURNER, D. J. N84-30746
TURNER, K. A. N84-30834
TURNER, S. E. N84-30946
TURNER, W. C. N84-30977
TUSZEWSKI, M. N84-30854
TYERYAR, J. R. N84-29968
TZONG, T. J. N84-30137

U

UDINTSEV, N. A. N84-30681
UPCHURCH, R. B. N84-30742
URMANCHEYEVA, T. G. N84-30650
USERY, E. L. N84-30406
USHAKOV, A. S. N84-30643
USHAKOV, I. B. N84-30657

V

VAGIN, N. I. N84-30492
VAICAITIS, R. N84-30888
VALAVANI, L. N84-30808
VALDES, J. N84-30381
VALENZUELA, C. N84-30381
VALGORA, M. E. N84-29931
VANARSDALL, P. J. N84-30288
VANCE, E. F. N84-30166
VANDAM, H. N84-30839
VANDERHOEVEN, W. N84-30097
VANDERKOLK, G. J. N84-30711
VANDERPEET, J. B. M. N84-30214
VANDERVELDT, R. N84-30708
VANDERWEES, A. J. N84-30253
VANDESANDE, E. N84-30254

VANDEVENDER, W. H. N84-30782
VANDIETEN, J. N84-30706
N84-30713
VANDIJK, A. N84-30715
VANECEK, D. N84-30912
VANHOOF, H. A. J. M. N84-30167
VANHUYGEVOORT, B. N84-30712
VANLEEUWEN, S. S. N84-30898
VANLUNTEREN-GERRITSEN, E. N84-30713
VANLUNTEREN, T. N84-30703
N84-30705
N84-30711
N84-30713
N84-30714
VANRIJSWIJK, M. W. N84-30316
VANROOYEN, D. N84-30032
N84-30033
VANTENDELOO, G. N84-30087
VANWIJK, R. N84-30705
VANWILLIGEN, H. N84-30005
VASILAKIS, A. D. N84-30138
VASIN, B. L. N84-30879
N84-30881
VASSILAROS, M. G. N84-30023
VAUGHN, B. F., JR. N84-30515
VELDHUYZEN, W. N84-30705
VERCHEVAL, J. N84-30565
VERDU, S. N84-30849
VERHOEVEN, J. D. N84-30037
VERMEULEN, J. N84-30213
VERVILLE, G. N84-30178
VETROV, V. Y. N84-30868
VEVELIS, J. B. N84-30258
VEYO, S. E. N84-30239
VICKREY, J. F. N84-30573
VICROY, D. D. N84-29871
VIRGIL, J. C. N84-30855
VIRKAR, A. V. N84-31027
VISWANATHAN, V. K. N84-30813
VLASENKO, L. S. N84-30865
VOEGELE, M. D. N84-30945
VOGEL, H. F. N84-30203
VOGEL, T. A. N84-30587
VOGELAAR, H. L. J. N84-29892
VOGL, O. N84-30000
VOLKOV, S. N. N84-30492
VOLKOV, V. V. N84-30869
VOLLAN, A. N84-30549
VONNEGUT, B. N84-30611
VONOHAIN, H. P. N84-29856
VONWARD, P. N84-30562
VORA, H. N84-30060
VREELAND, T., JR. N84-30056
VULFSON, A. N. N84-30489

W

WADA, M. N84-30115
WADLINGER, E. A. N84-30165
WAGNER, H. G. N84-30010
WAKURI, T. N84-30174
WALD, S. N84-30784
WALDEN, H. J. N84-31048
WALIGORA, J. M. N84-30684
WALKER, J. A. N84-30373
WALKER, N. B. N84-30573
WALKER, R. B. N84-30919
WALKER, R. E. N84-30392
WALLACE, S. J. N84-30926
WALSER, D. N84-31069
WALSH, E. K. N84-30896
WALTER, L. S. N84-30475
WALTER, P. L. N84-30346
WALTERS, E. A. N84-30901
WALTON, O. R. N84-30244
WALTZ, F. A. N84-30421
WAMPLER, W. R. N84-30997
WANG, C. H. N84-29963
WANNAMAKER, B. N84-30512
WARREN, R. N84-29872
WARRICK, J. C. N84-29868
WARWICK, A. I. N84-30912
WASSERMAN, L. H. N84-31066
WATSON, J. M. N84-30277
WATTERSON, R. N84-30981
WAUGH, K. N84-30519
WEAVER, M. J. N84-29984
N84-29985
N84-29988
N84-29989
N84-29990
WEAVER, P. P. N84-30950
WEBB, W. N84-30360
WEBB, W. E. N84-30172
WEBER, W. N84-30501
N84-30505
N84-30509
WEDEN, G. J. N84-30294
WEINER, H. N84-30848
WEINGARTEN, D. H. N84-30903
WEISBIN, C. R. N84-30615
WEISCHEDEL, H. R. N84-30321
WELCH, R. N84-30406
WELKER, J. E. N84-30472
N84-30474
WELTE, D. N84-30549
WENDELL, L. L. N84-30547
WENGER, J. N84-30234
WENZEL, R. G. N84-30285
WESTBROOK, C. K. N84-30312
WHEATLEY, J. C. N84-30895
WHEELER, R. N84-30530
WHELESS, T. K. N84-30337
WHITE, C. L. N84-30028
WHITE, C. W. N84-30052
WHITE, R. A. N84-30211
WHITE, S. N84-30637
WHITE, T. N84-30707
WHITE, T. J. N84-30688
WHITLOW, J. B., JR. N84-29878
WHITMORE, R. W. N84-30560
WICHMANN, B. A. N84-30792
WICKLUND, L. L. N84-29965
WIDEGREN, I. N84-30692
WIEDERMANN, A. H. N84-30243
N84-30345
WIJNMALEN, D. J. D. N84-31043
WILDER, J. A., JR. N84-30091
WILHELMS, S. C. N84-30130
WILKE, C. R. N84-30110
WILKENING, K. E. N84-30556
WILKINS, M. L. N84-30132
WILKINSON, C. L. N84-29931
WILLI, O. N84-30289
WILLIAMS, D. L. N84-30410
N84-30418
WILLIAMS, G. P. N84-31020
WILLIAMS, J. G. N84-29972
WILLIAMS, J. M. N84-30052
WILSON, J. A. N84-31010
WILSON, K. L. N84-30969
WILSON, R. G. N84-31010
WILSON, R. K. N84-30896
WINSKE, D. N84-30582
WINTER, D. T. N84-30792
WINTER, N. N84-30921
WIRTHS, G. N84-30549
WITHERSPOON, F. D. N84-30998
WITT, R. G. N84-30430
N84-30432
WOERNER, R. N84-30921
WOLCOTT, E. N84-29948
WOLTERING, A. B. N84-30167
N84-30168
WONG, H. N84-30110
WONG, I. G. N84-30516
WONG, S. K. N84-30993
WONG, T. C. N84-29851
WOOD, D. H. N84-30689
WOOD, J. L. N84-29962
WOODFIN, G. N84-30813
WOODRUFF, C. M., JR. N84-30578
WORRELL, R. B. N84-30842
WRIGHT, B. L. N84-30989
WRIGHT, B. W. N84-30986
WRIGHT, J. D. N84-30534
WRIGHT, W. J. N84-30268
WRIGLEY, R. N84-30510
WRIGLEY, R. C. N84-30396
N84-30408
WU, C. S. N84-30900
WU, R. N84-30051
WU, S. J. N84-30083
WUBS, F. W. N84-30253
WUEBKER, F. E. N84-30759
WUERCH, D. R. N84-30578
WYMAN, R. H. N84-30807

X

XIULING, Y. N84-30068

Y

YAKOVLEV, I. A. N84-30868
YAKOVLEV, N. L. N84-30870
YAMANAKA, K. N84-30965
YAMAUCHI, R. K. N84-30113
YAMAZAKI, S. N84-30123
YANAGISAWA, M. N84-30569
YANG, D. C. N84-30184
YANG, J. N. N84-29865
N84-29866
YAO, S. N84-30415
YAO, S. S. N84-30398
YARISH, H. N84-30674
YASUKAWA, E. N84-31075
YEE, D. N84-30751
YEE, R. Y. N84-29861
YEGOROV, N. I. N84-30872
YELFIMOV, A. I. N84-30856
YEROKHIN, A. A. N84-30879
YEVGRAFYEV, V. P. N84-30855
YI-CHENG, Z. N84-30937
N84-30936
YOCHMOWITZ, M. G. N84-30869
YOO, M. H. N84-30028
YOUNG, J. E. N84-30205
YOUNG, R. W. N84-30890
YOUNG, T. R. N84-30230
YOUNGDAHL, C. K. N84-30243
YOUNKER, L. W. N84-30587
YU, K. B. N84-30394
YU, S. N84-30209
YU, S. S. N84-30909
YU, T. L. N84-30932
YUAMA, K. N84-31006
YUAN, C. P. N84-30182
YUJUN, S. N84-30069
YUN, S. W. N84-30189
YUPING, W. N84-30064
YUROVA, K. S. N84-30844
N84-30853
YUSHAN, M. N84-30068

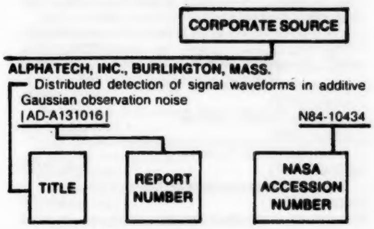
Z

ZACHARA, J. M. N84-30557
ZACHOS, C. N84-31026
ZAIGIN, M. N84-30067
ZAKHARENKOV, Y. A. N84-30878
ZALAS, J. M. N84-30886
ZANDBERGEN, I. N84-30896
ZAVARITSKIY, N. V. N84-30865
ZAWACK, D. J. N84-31036
ZELENETSKII, V. A. N84-30220
ZHANG, Q. F. N84-29877
ZHENG, Y. N84-30065
ZHIDKOV, V. V. N84-30846
ZHILTSOVA, V. M. N84-30680
ZIMMERMAN, R. M. N84-30945
ZINGERMAN, L. S. N84-30844
ZINKE, P. N84-30439
ZOBRIST, A. L. N84-30392
ZOREV, N. N. N84-30878
N84-30879
ZUITHOFF, M. N84-30713
ZWEIFEL, P. F. N84-30838
ZYVOLOSKI, G. A. N84-30539

CORPORATE SOURCE INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 22 NUMBER 20

Typical Corporate Source Index Listing


CORPORATE SOURCE
ALPHATECH, INC., BURLINGTON, MASS.
Distributed detection of signal waveforms in additive Gaussian observation noise
[AD-A131016]
N84-10434
TITLE
REPORT NUMBER
NASA ACCESSION NUMBER

Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ADVANCED MECHANICAL TECHNOLOGY, INC., NEWTON, MASS.
Integrated gas-fired space heating/water heating system with electric air conditioning [PB84-181999] N84-30136

ADVANCED RESEARCH RESOURCES ORGANIZATION, SILVER SPRING, MD.
Analysis of computer interactive tests for assigning helicopter pilots to different missions [AD-A142434] N84-30696

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
A survey of biodynamic test devices and methods [AD-A142467] N84-29894

AEROJET STRATEGIC PROPULSION CO., SACRAMENTO, CALIF.
A NDT ignition delay predictive tool N84-29958

AEROJET TECHNICAL SYSTEMS CO., SACRAMENTO, CALIF.
Low cost manufacturing of tactical rocket motors N84-29959

AEROJET TECHSYSTEMS CO., SACRAMENTO, CALIF.
Dual mode propulsion system engine testing for INTELSAT N84-29913
Shuttle payload improvement by low risk modifications to the OMS engine N84-29925

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
Strains in an elastic plate containing an interference-fit bolt near a free edge [AR-003-012] N84-30333

AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AFB, OHIO.
NASTRAN analysis comparison to shock tube tests used to simulate nuclear overpressures [AD-A142290] N84-30337

AEROSPACE CORP., EL SEGUNDO, CALIF.
Electrostatic filtration of N2O4 for removal of solid and vapor contaminants N84-29922

AEROSPACE MEDICAL DIV. AEROSPACE MEDICAL RESEARCH LABS. (6570TH), WRIGHT-PATTERSON AFB, OHIO.
Horizontal diplopia thresholds for head-up displays [AD-A141965] N84-29872
Crest: Crew escape technologies for the 1990's N84-29944

AGRICULTURAL RESEARCH CENTER, BELTSVILLE, MD.
Comparison of the information content of data from the LANDSAT-4 Thematic Mapper and the Multispectral Scanner N84-30420

AIR FORCE ACADEMY, COLO.
Air Force Academy Aeronautics Digest [AD-A142399] N84-29849

AIR FORCE FLIGHT DYNAMICS LAB., WRIGHT-PATTERSON AFB, OHIO.
APL/JHU free flight tests of the general purpose heat source module. Testing: 5-7 March 1984 [DE84-011065] N84-30948

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.
The Earth's radiation belts [AD-A142673] N84-30574
Prediction of slant wind shear with an offset tower observation system [AD-A142676] N84-30600
An assessment of interactive graphics processing in short-range terminal weather forecasting [AD-A142706] N84-30601

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
A computer model for evaluation of launch vehicle and target tracking error assignments for direct ascent, deep space ASAT (Anti-satellite) systems [AD-A141136] N84-29896
Performance measurement in a distributed processing environment [AD-A142410] N84-30722
The Spot of Arago and its role in aberration analysis [AD-A141963] N84-30952

AIR FORCE LOGISTICS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Network repair level analysis model user's guide [AD-A141991] N84-30743

AIR FORCE ROCKET PROPULSION LAB., EDWARDS AFB, CALIF.
AFRPL solar-thermal rocket activities N84-29936

AIR FORCE SYSTEMS COMMAND, EGLIN AFB, FLA.
Weapons file [AD-A142506] N84-29867

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Aeronautical Materials (selected articles) [AD-A139952] N84-30063
Influences of directionally solidified techniques and hafnium content on a nickel base high temperature alloy N84-30064
A study of the tempering transformation of retained austenite in isothermal quenching structures, bainite tempered embrittlement N84-30065
The effects of solid solution temperatures and cooling rates on the microstructures of BT3-1 titanium alloy N84-30066
Influence of temperature on the Delta K sub th and da/dN of LY-12CS aluminum alloy N84-30067
Preliminary investigation of fatigue crack propagation of 30CrMnSIA steel in salt spray corrosion conditions N84-30068
Study of the fatigue crack propagation characteristics of YB-3 and YB-4 aeronautical organic glass N84-30069
The effects of non-metallic inclusions in steel on fatigue properties N84-30070
Characteristics of initial period fatigue crack propagation of metals and its affecting factors N84-30071

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
A data acquisition and real-time display system for testing a jet engine compressor [AD-A142696] N84-30301
Effects of variations in coldworking repair procedures on flaw growth and structural life [AD-A141966] N84-30336
Air force technical objective document FY 85 [AD-A141925] N84-31033

AIR PRODUCTS AND CHEMICALS, INC., ALLENTOWN, PA.
Solid state compressor [AD-A142605] N84-30300

AIRBORNE RESEARCH ASSOCIATES, WESTON, MASS.
Meteorological research and support for the MIZEX (Marginal Ice Zone Experiment) program [AD-A142409] N84-30698

AKRON UNIV., OHIO.
Durability of adhesive bonds with ionic bonds at the interface N84-29960

ALABAMA UNIV., HUNTSVILLE.
OMV: A simplified mathematical model of the orbital maneuvering vehicle [NASA-CR-171123] N84-29902
EValuation of a 96V EV 1000 battery pack at temperature extremes [PB84-187723] N84-30217
Evaluation of 96V exide EPV23-3 battery pack at temperature extremes [PB84-187749] N84-30218
Evaluation of an 96V ALCO 2200 battery pack at temperature extremes [PB84-187731] N84-30219
The design and testing of an electrolyte destratification system applied to a 96 V Alco 2200 battery [PB84-184894] N84-30550

AMES LAB., IOWA.
Directional growth of pearlite in Fe-C eutectiod alloys [DE84-007366] N84-30042
Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests [DE84-012833] N84-30054

AMOCO OIL CO., NAPERVILLE, ILL.
Study of ebullated bed fluid dynamics [DE84-010230] N84-30251

ANALYTICAL MECHANICS ASSOCIATES, INC., HAMPTON, VA.
STS-13 (41-C) BET products [NASA-CR-172350] N84-29901

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
The 1984 JANNAF Propulsion Meeting, volume 1 [AD-A142852] N84-29906
The 1984 JANNAF Propulsion Meeting, volume 2 [AD-A143025] N84-29939

APPLIED RESEARCH LAB., STATE COLLEGE, PA.
Modified 5-point and 9-point schemes for the solution of the Vorticity- transport equation with cross derivatives [AD-A142720] N84-30651

ARGONNE NATIONAL LAB., ILL.
Oxidation-sulfidation behavior of Fe-Cr-Ni alloys containing additions of Zr, Nb, or Ti [DE84-005411] N84-30043
Application of transverse-section analytical electron microscopy to the study of oxidation of metal alloys [DE84-006415] N84-30049
Advanced battery development in the US [DE84-010505] N84-30190
New 1-phase dual converter for superconducting inductive energy storage and transfer applications: The 1-phase inductor-converter bridge [DE84-012116] N84-30193
Thermal laminarization of a stratified pipe flow [DE84-006407] N84-30236
Experiments on tubes conveying fluid [DE84-004031] N84-30237
Numerical treatment of pipe boundary conditions in two-phase flow [DE84-006553] N84-30238
Stability of tubes conveying fluid [DE84-010573] N84-30240
Flow Induced Vibration Program at Argonne National Laboratory [DE84-009233] N84-30249
Active ultrasonic cross-correlation flowmeters for mixed-phase pipe flows [DE84-006449] N84-30260
Determination of thermal-degradation rates of some candidate Rankine-cycle organic working fluids for conversion of industrial waste heat into power [DE84-009585] N84-30304
Logic machine architecture inference mechanisms: Layer 2 user reference manual release 2.0 [DE84-012115] N84-30728
Guide to graphics at ANL, revised [DE84-013189] N84-30786

Argonne integrated heterogeneous file transfer network
[DE84-012092] N84-30803

Design philosophy for reliable systems, including control
[DE84-012881] N84-30814

High-current, low-energy synchrotrons and compressor rings
[DE84-012104] N84-30906

Comparison of some SSC beam parameters for pp and anti pp
[DE84-010729] N84-30908

Photoelectron studies of excited molecular states: H2 C (1)Pi(sub u) and N2 o3 (1)Pi(sub u)
[DE84-008663] N84-30917

Photoionization of excited molecular states using multiphoton excitation techniques
[DE84-004034] N84-30925

Modeling the interaction of high power ion or electron beams with solid target materials
[DE84-009126] N84-30931

Liquid metal breeder-coolant blanket concept
[DE84-006554] N84-30971

Cation self-diffusion in Fe2O3
[DE84-009152] N84-31025

Renormalized action improvements
[DE84-011810] N84-31028

ARIZONA UNIV., TUCSON.

In-flight absolute radiometric calibration of the Thematic Mapper N84-30383

MTF analysis of LANDSAT-4 Thematic Mapper
N84-30388

Studies of X-ray clusters of galaxies/intergalactic plasmas
[NASA-CR-173825] N84-31068

ARIZONA WATER RESOURCES RESEARCH CENTER, TUCSON.

Estimation of recharge in a small southern Arizona basin by means of hydrological, hydrochemical, and environmental isotope data
[PB84-159672] N84-30527

ARMED FORCES RADIOBIOLOGY RESEARCH INST., BETHESDA, MD.

The toxicity of petroleum and shale JP5
[AD-A142670] N84-30690

Karnovsky-osmium as a primary fixative for electron microscopy
[AD-A142671] N84-30957

ARMS CONTROL AND DISARMAMENT AGENCY, WASHINGTON, D. C.

Theory and applications of random fields
[AD-A142346] N84-30847

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.

Self-propagating high-temperature synthesis of ceramics in vacuum
[AD-A142506] N84-30079

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.

Cadmium plating versus other coatings to prevent corrosion
[AD-A142504] N84-30022

On the extremum of bilinear functional for hyperbolic type partial differential equations
[AD-A142505] N84-30828

ARMY COMMUNICATIONS-ELECTRONICS COMMAND, FORT MONMOUTH, N.J.

Proceedings of the 2nd Annual Conference on Ada (Trademark) Technology
[AD-A142403] N84-30745

The Army Ada (trademark) education program
[AD-P003414] N84-30746

ARMY ENGINEER TOPOGRAPHIC LABS., FORT BELVOIR, VA.

Voice Interactive Systems Technology (VIST) research
[AD-A142698] N84-30726

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.

Measurements of dissolved gases at Corps of Engineers projects
[AD-A142727] N84-30130

Tensile crack exposure tests. Statistical analysis of the long-term durability of series B beams
[AD-A141955] N84-30335

Documentation of wave-height and tidal analysis programs for automated data acquisition and control systems
[AD-A142679] N84-30634

ARMY ENVIRONMENTAL HYGIENE AGENCY, ABERDEEN PROVING GROUND, MD.

Guidelines for running the thermal computational model of the eye
[AD-A142550] N84-30688

ARMY RESEARCH AND TECHNOLOGY LABS., CLEVELAND, OHIO.

Comparison of icing cloud instruments for 1982-1983 icing season flight program
[NASA-TM-83569] N84-29870

Transmission efficiency measurements and correlations with physical characteristics of the lubricant
[NASA-TM-83740] N84-30293

Summary of drive-train component technology in helicopters
[NASA-TM-83726] N84-30294

ASTRO RESEARCH CORP., CARPINTERIA, CALIF.

Support structures for large infrared telescopes
[NASA-CR-3800] N84-30328

ATLANTIC RESEARCH CORP., GAINESVILLE, VA.

Energy management for crew escape systems
N84-29945

A tractable theory for nonlinear propellant response and cumulative damage predictions N84-29950

B

BARCELONA UNIV. (SPAIN).

Qualitative study of the planar isosceles three-body problem
[PREPRINT-35] N84-29896

BATTELLE COLUMBUS LABS., OHIO.

Some scoping experiments for a space reactor
[DE84-009101] N84-30941

BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.

Chemical attenuation rates, coefficients, and constants in leachate migration. Volume 1: A critical review
[DE84-009432] N84-30557

BAYLOR COLL. OF MEDICINE, HOUSTON, TEX.

International Workshop on Biophysical Correlates of Cellular Function UNESCO
[AD-A142490] N84-30671

BELL TELEPHONE LABS., INC., GREENSBORO, N. C.

Study of the FAA (Federal Aviation Administration) program to modernize maintenance operations
[AD-A142295] N84-29848

BEN GURION UNIV. OF THE NEGEV, SEDE BOQER (ISRAEL).

Desert emergency - lack of water - how to find and collect water. Plants and human survival in the desert
[AD-A142025] N84-30513

BENDIX CORP., KANSAS CITY, MO.

Initial insights on robotics
[DE84-010768] N84-30302

Robotic deburring. Part 1: Preliminary observations
[DE84-010766] N84-30305

BIELEFELD UNIV. (WEST GERMANY).

A variational formulation for dissipative maps
[REPT-81] N84-30846

A nonstandard construction of Levy Brownian motion
[REPT-82] N84-30861

Stochastic quantization: Stabilizing quantum models
[REPT-80] N84-31032

BOLT, BERANEK, AND NEWMAN, INC., CANOGA PARK, CALIF.

Overground Excess Sound Attenuation (ESA). Volume 2: Analysis of data for flat grassy terrain conditions
[AD-A142420] N84-30892

BOSTON UNIV., MASS.

Investigation of the structure of photosynthetic reaction centers
[DE84-012475] N84-30005

Nonlinear dynamics of multi-channel binocular vision
[AD-A142600] N84-30689

BRITISH AEROSPACE AIRCRAFT GROUP, WARTON (ENGLAND).

Wall pressure signature wind-tunnel wall-constraint correction methods
[BAE-ARG-188] N84-29887

BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).

The present status of Clean PAL systems
[BBC-RD-1984/6] N84-30142

BRITISH BROADCASTING CORP., LONDON (ENGLAND).

Filtering of the colour-difference signals in 4:2:2 YUV digital video coding systems
[BBC-RD-1984/4] N84-30141

BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).

Explosion parameters of ferroalloy dusts
[BLL-M-35571-(5828.4)] N84-30102

Invariance of level of rotating liquid
[BLL-M-35611-(5828.4)] N84-30220

Scope for active noise abatement in vehicle diesel engines
[BLL-M-28767-(5825.4)] N84-30885

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.

Photovoltaic-electrolyzer system transient simulation results
[DE84-010217] N84-29995

Potential-determining reactions during pitting corrosion of aluminum
[DE84-007695] N84-30031

Intergranular failures of Alloy 600 in high temperature caustic environments
[DE84-010690] N84-30032

Mechanisms of intergranular failures in Alloy 600 in high temperature environments
[DE84-010514] N84-30033

The photoelectrochemistry of conducting polymers
[DE84-010689] N84-30093

Chemical-hydrogen energy systems
[DE84-012876] N84-30112

Secondary alkaline batteries
[DE84-010963] N84-30191

Rechargeable zinc batteries
[DE84-008947] N84-30192

Effect of charging methods on battery electrodes
[DE84-010267] N84-30196

A finite element method for treating nearly one way wave propagation
[DE84-010294] N84-30889

Nuclear and particle physics aspects of hyperon and antinucleon interactions
[DE84-010793] N84-30905

Hypernuclear research at the AGS
[DE84-010282] N84-30915

Monte Carlo simulation of the microcanonical ensemble
[DE84-010880] N84-30923

Accelerator-based atomic physics experiments with photon and ion beams
[DE84-010789] N84-30928

BROWN UNIV., PROVIDENCE, R. I.

Elastic-plastic deformation of pulse-loaded structures
[AD-A142350] N84-30339

Comparison of methods for calculating energy release rates
[DE84-012231] N84-30350

BUNDESMINISTERIUM FUER FORSCHUNG UND TECHNOLOGIE, BONN (WEST GERMANY).

The use of space laboratories for materials investigations, process engineering, and scientific purposes N84-29895

BUREAU OF MINES, ALBANY, OREG.

Sulfidation- and oxidation-resistant ferritic stainless steel containing aluminum
[PB84-189521] N84-30101

BUREAU OF MINES, AMARILLO, TEX.

Analyzer for determining helium-4 in the part-per-billion range
[PB84-189554] N84-30272

BUREAU OF MINES, BARTLESVILLE, OKLA.

Aviation fuels, 1983
[DE84-011823] N84-30106

BUREAU OF MINES, UNIVERSITY, ALA.

Corrosion resistance of selected ceramic materials to nitric acid
[PB84-178870] N84-30098

Magnesia refractories produced from chemically modified periclase grains and Mg(OH)2 slurries
[PB84-178979] N84-30099

Ground penetrating radar: A review of its application in the mining industry, information circular 1984
[PB84-178292] N84-30172

C

CALIFORNIA INST. OF TECH., PASADENA.

Mechanical properties of a shock consolidated steel powder
[DE84-003573] N84-30056

Natural convection flows and associated heat transfer processes in room fires
[PB84-171172] N84-30140

CALIFORNIA UNIV., BERKELEY.

Fatigue behavior of long and short cracks in wrought and powder aluminum alloys
[AD-A142609] N84-30024

Diffusion of gases in porous solids: Simulations and measurements
[DE84-010822] N84-30241

Characterization of LANDSAT-4 TM and MSS image quality for interpretation of agricultural and forest resources N84-30411

Growth and characterization of metal oxide whiskers for aerosol filtration
[DE84-011049] N84-31021

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Vortex methods and turbulent combustion
[DE84-011874] N84-30004
Influence of processing on the cryogenic mechanical properties of high strength high manganese stainless steel
[DE84-008242] N84-30027
Galvanic corrosion of an aluminum O-ring
[DE84-011345] N84-30047
Low temperature sintering of Al2O-CaO
[DE84-010713] N84-30083
High resolution electron microscopy studies of the early stages of decomposition in alloys and ceramics
[DE84-020802] N84-30087
Nutritional and environmental factors in ethanol fermentation by Saccharomyces cerevisiae
[DE84-009693] N84-30110
Performance of Beverage antennas at low angles
[DE84-011163] N84-30164
Near-threshold fatigue crack propagation: A perspective on the role of crack closure
[DE84-009889] N84-30202
Transport properties of concentrated solutions
[DE84-008495] N84-30210
Proposed scientific activities for the Salton Sea scientific drilling project
[DE84-012256] N84-30586
Daylight availability as a function of atmospheric conditions
[DE84-007973] N84-30609
Enhancements to the codata definition language
[DE84-010579] N84-30783
WC user's guide
[DE84-009242] N84-30784
A 6.5 Tesla SSC lattice example
[DE84-010719] N84-30858
A high current heavy ion beam transport experiment at LBL
[DE84-009225] N84-30912
High-spin gamma-ray spectroscopy
[DE84-010716] N84-30929
Determination of energetics and spectra of simple molecular systems using theoretical methods
[DE84-009668] N84-30930
Optical second-harmonic generation for surface studies
[DE84-010718] N84-30958
Electrochromic materials for the regulation of solar energy transmission through windows
[DE84-012165] N84-31029

CALIFORNIA UNIV., DAVIS.
The role of sintering in the oxidation-reduction of palladium powders
[DE84-011202] N84-30059
Investigation of the role of sintering in gas-solid interactions
[DE84-010862] N84-30089
Laboratory for Energy Related Health Research
[DE84-000529] N84-30672

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Definition of the concentration gradient above flammable liquids
[DE84-008296] N84-29996
Analysis of localized microstructural changes in dynamically consolidated metal powders
[DE84-006298] N84-30026
Corrosion of 5083 aluminum by aqueous sodium sulfate
[DE84-012033] N84-30045
The evaporation and gaseous dispersion of large-scale releases of nitrogen tetroxide
[AD-A142079] N84-30104
High performance Extrusion Cast Explosives (ECK)
[DE84-008244] N84-30107
Design of a safety monitor system for high explosives machining
[DE84-010101] N84-30113
Dynamic powder compaction
[DE84-006133] N84-30132
Computer-generated movie on the short pulse electromagnetic behavior of wire objects
[DE84-012032] N84-30162
Development of hydrocyclones for aluminum/air battery applications
[DE84-011403] N84-30197
Application of molecular dynamics to macroscopic particles
[DE84-011066] N84-30244
TOPAZ: A finite element heat conduction code for analyzing 2-D solids
[DE84-010676] N84-30247
Photoemissive materials for 0.35 Micron laser fiducials in X-ray streak cameras
[DE84-008348] N84-30283
Nova laser alignment control system
[DE84-010992] N84-30288
Modeling chemical kinetic aspects of engine knock
[DE84-009674] N84-30312
Reliability analysis for stiff versus flexible piping
[DE84-008325] N84-30344
Response to W. W. Kellogg's Carbon Dioxide and Climatic Change
[DE84-010986] N84-30577
An assessment of methods of geological basin analysis for application to the Uinta and Piceance Basins
[DE84-012369] N84-30581
Chemical evolution of a high-level magma system: The Black Mountain Volcanic Center, Southern Nevada
[DE84-013321] N84-30587
Natural phenomena hazards modeling project: Extreme wind-tornado hazard models for Department of Energy sites
[DE84-011157] N84-30608
Review of the Third Biennial Conference on Real-Time Computer Applications in Nuclear and Particle Physics
[DE84-002457] N84-30720
Supercomputers: The next ten years. A user's view
[DE84-011072] N84-30727
Communicating between the IBM personal computer and the Wang word processing system
[DE84-010423] N84-30729
An operating system and memory switch for the S-1 computer
[DE84-013084] N84-30731
The S-1 Mark IIA supercomputer
[DE84-012374] N84-30732
Bond graph time simulations using extracted modal parameters from the Nova spaceframe
[DE84-010918] N84-30779
Linear systems analysis program user's manual, version 2.2 (VAX/VMS)
[DE84-012230] N84-30789
Syntax and semantics of a LINCS control monologue
[DE84-011399] N84-30805
Serial link protocol design: A critique of the X.25 standard, level 2
[DE84-002724] N84-30806
Report on the experience with the Supervisory Control and Diagnostics System (SCDS) of MFTF-B
[DE84-012599] N84-30807
Linear systems analysis program: Programmer's manual, version 2.2 (VAX/VMS)
[DE84-010953] N84-30835
Observed current enhancement with propagation of the ETA electron beam in air
[DE84-010558] N84-30909
Calculation of molecular final states and their effect on a precision neutrino mass experiment
[DE84-011071] N84-30921
Impurity characteristics of TMX-U
[DE84-012413] N84-30932
Microstability theory for distributions separable in energy and pitch angle
[DE84-009683] N84-30991
Defect production efficiencies in thermal neutron irradiated copper and molybdenum
[DE84-010993] N84-31018
Fractional quantization of the Hall effect
[DE84-008894] N84-31023
Cosmic bombardment
[DE84-011402] N84-31071

CALIFORNIA UNIV., LOS ANGELES.
Stabilization studies
[AD-A142844] N84-30832
Magnetic fusion energy plasma interactive and high heat flux components. Volume 1: Technical assessment of the critical issues and problem areas in the plasma materials interaction field
[DE84-011527] N84-30969
Studies of CO2 laser interactions with plasma
[DE84-012485] N84-31004

CALIFORNIA UNIV., RICHMOND.
System identification of structures with joint rotation
[PB84-192210] N84-30357

CALIFORNIA UNIV., SAN DIEGO.
Inductive information retrieval using parallel distributed computation
[AD-A142712] N84-31050

CALIFORNIA UNIV., SANTA BARBARA.
Photoelectrochemistry at iron oxide electrodes
[DE84-011453] N84-30003
Snow reflectance from LANDSAT-4 Thematic Mapper
N84-30426

CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
CO2 gamma 3 fundamental band 4.5 micrometers laser potential
[AD-A142536] N84-29991

CALSPAN FIELD SERVICES, INC., ARNOLD AIR FORCE STATION, TENN.
Aerodynamic and Propulsion Test Unit (APTU) performance with a vitiated air heater N84-29964

CANADA CENTRE FOR REMOTE SENSING, OTTAWA (ONTARIO).
Revised radiometric calibration technique for LANDSAT-4 Thematic Mapper data by the Canada Centre for Remote Sensing N84-30378
Radiometric calibration and geocoded precision processing of LANDSAT-4 Multispectral Scanner products by the Canada Centre for Remote Sensing N84-30404

CARDINAL MANAGEMENT ASSOCIATES, INC., WASHINGTON, D.C.
Appropriate Technology Small Grants Program evaluation, volume 1: Executive summary
[DE84-010675] N84-31038
Appropriate Technology Small Grants Program evaluation, volume 2
[DE84-010674] N84-31039

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Precision flexible machining cells within a manufacturing system
[AD-A142527] N84-30129
A summary of fault tolerant computing research at Carnegie Mellon University
[AD-A142707] N84-30777
A problem expanding parametric programming method for solving the job shop scheduling problem
[AD-A142392] N84-31036

CBI INDUSTRIES, INC., OAK BROOK, ILL.
Shelf mounted ocean thermal energy conversion platform, revised preliminary report
[PB84-185230] N84-30551

CENTER FOR MATHEMATICS AND COMPUTER SCIENCE, AMSTERDAM (NETHERLANDS).
Guidelines for the design of large modular scientific libraries in Ada
[CWI-NM-N8401] N84-30792

CENTRE NATIONAL DE RECHERCHES DE L'ESPACE, BRUSSELS (BELGIUM).
Space research in Belgium, 1982-1983 N84-31084

CENTRO INFORMAZIONI STUDI ESPERIENZE, MILAN (ITALY).
GAME: An interactive graphic system for automatic mesh generation
[CISE-2211] N84-30790

CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).
Active sound reduction: A study of recent developments and some future possibilities
[F83-06] N84-30899

CHIBA UNIV. (JAPAN).
Random-choice solutions for two-dimensional and axisymmetric supersonic flows N84-30115

CHUBY ELECTRIC POWER CO. (JAPAN).
Study of latent heat storage system used heat pipes for cooling of underground cables N84-30127

CITY UNIV. OF NEW YORK, N. Y.
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas
[DE84-012396] N84-31002

COAST GUARD RESEARCH AND DEVELOPMENT CENTER, GROTON, CONN.
Evaluation of U.S. Coast Guard forward-looking airborne radars
[AD-A142417] N84-30156

COLORADO STATE UNIV., FORT COLLINS.
Open cycle lithium chloride cooling system
[DE84-005831] N84-30234
Studies of Chebyshev spectral methods and multigrid methods
[AD-A142014] N84-30596

COLORADO UNIV., BOULDER.
Organophosphate toxicity: Genetics, receptors, and antidotes
[AD-A141059] N84-30685

COLUMBIA UNIV., NEW YORK.
Experimental study of noise transmission into a general aviation aircraft
[NASA-CR-172357] N84-30888

COMMERCE DEPT., WASHINGTON, D.C.
Flexure hinge
[PB84-178557] N84-30319

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
Cabin air quality
[GPO-29-522] N84-30702

COMMITTEE ON ENERGY AND COMMERCE (U. S. HOUSE).
US technology transfer to China
[GPO-29-567] N84-31064

COMMITTEE ON SCIENCE AND TECHNOLOGY.(U. S. HOUSE).
Land Remote-Sensing Commercialization Act of 1984
[H-REPT-98-647] N84-31063

COMPTROLLER GENERAL OF THE UNITED STATES, WASHINGTON, D.C.

Stronger direction needed for the National Earthquake Program

[GAO/RCED-83-103] N84-30570

CONFERENCE OF RADIATION CONTROL PROGRAM DIRECTORS, INC., ROCKVILLE, MD.

Instrumentation for nonionizing radiation measurement

[PB84-180603] N84-30271

CONNECTICUT UNIV., STORRS.

Salinity and temperature effects on photosynthesis and organic carbon release rates by selected benthic macroalgae

[PB84-163148] N84-30674

CORNELL UNIV., ITHACA, N.Y.

Thin film synthesis of superconducting chemical compounds

[AD-A142541] N84-29992

Simulation of ultra-low emittance electron storage rings

[DE84-012050] N84-31024

CRANBROOK INST. OF SCIENCE, BLOOMFIELD HILLS, MICH.

Partitioning of toxic trace metals between solid and liquid phases in the Great Lakes

[PB84-177849] N84-30525

CUMMINS ENGINE CO., INC., COLUMBUS, IND.

Utilization of SRC-2 fuel in an insulated diesel engine

[DE84-004386] N84-30111

D

DARTMOUTH COLL., HANOVER, N.H.

Electron cyclotron radiation from mirror-confined plasma

[DE84-008665] N84-30970

DAYTON UNIV., OHIO.

Thrust augmentation study of high performance ejectors

[AD-A142650] N84-29856

Flaw detection reliability criteria. Volume 1: Methods and results

[AD-A142001] N84-30320

DEFENCE RESEARCH ESTABLISHMENT, OTTAWA. (ONTARIO).

Rapid electrolyte exchange procedures for 22 AH nickel-cadmium celgard cells

[AD-A142004] N84-30178

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY, ARLINGTON, VA.

Strategic computing: New-generation computing technology: A strategic plan for its development and application to critical problems in defense

[AD-A141982] N84-30721

DEFENSE INTELLIGENCE AGENCY, WASHINGTON, D.C.

Bibliography of Soviet laser developments, number 64, March -April 1983

[AD-A141906] N84-30275

DEFENSE TECHNICAL INFORMATION CENTER, ALEXANDRIA, VA.

Government acronyms and alphabetic organizational designations used in DTIC (Defense Technical Information Center)

[AD-A142700] N84-31049

Defense Technical Information Center referral data bank directory

[AD-A138400] N84-31051

DELAWARE UNIV., NEWARK.

Aboveground biomass estimation in a tidal brackish marsh using simulated Thematic Mapper spectral data N84-30419

Parametric and nonparametric analysis of LANDSAT TM and MSS imagery for detecting submerged plant communities N84-30424

Propagating long waves on oceanic density fronts: An analytic model

[AD-A141915] N84-30628

Inverse scattering problem

[AD-A142634] N84-30894

Chemical vapor deposition of amorphous semiconductor films

[DE84-004469] N84-31026

DEPARTMENT OF AGRICULTURE, WASHINGTON, D.C.

A first evaluation of LANDSAT TM data to monitor suspended sediments in lakes N84-30425

DEPARTMENT OF ENERGY, WASHINGTON, D. C.

Electropositive bivalent metallic ion unsaturated polyester complexed polymer concrete

[DE84-011080] N84-29979

Integral low-energy thermite igniter

[DE84-011082] N84-29999

Ultraviolet light absorbers having 2 different chromophors in the same molecule

[DE84-011279] N84-30000

Tantalum-copper alloy and method for making

[DE84-011081] N84-30037

Ductile aluminide alloys for high temperature applications

[DE84-011037] N84-30038

Improved oxidation sulfidation resistance of Fe-Cr-Ni alloys

[DE84-010068] N84-30039

Hard metal composition

[DE84-011034] N84-30040

Synthesis of refractory materials

[DE84-011045] N84-30041

Method of enhancing selective isotope desorption from metals

[DE84-011031] N84-30044

Ceramic to metal attachment system

[DE84-011095] N84-30085

Graphite-ceramic RF Faraday-thermal shield and plasma limiter

[DE84-010960] N84-30086

Method and apparatus for producing high purity silicon

[DE84-011087] N84-30090

Electron emitting filaments for electron discharge devices

[DE84-011098] N84-30201

Rigid indented cylindrical cathode for X-ray tube

[DE84-011093] N84-30204

Steam reforming of fuel to hydrogen in fuel cell

[DE84-011115] N84-30205

Manipulator having thermally conductive rotary joint for transferring heat from a test specimen

[DE84-010958] N84-30242

Shock wave absorber having a deformable liner

[DE84-011308] N84-30243

Helical screw viscometer

[DE84-011111] N84-30261

Void-particulate director

[DE84-011300] N84-30262

Improved graphite furnace atomizer

[DE84-011091] N84-30263

Rotational viscometer for high-pressure, high-temperature fluids

[DE84-011094] N84-30264

Improved gaseous leak detector

[DE84-011295] N84-30265

High resolution, high rate X-ray spectrometer

[DE84-011116] N84-30266

Vapor spill pipe monitor

[DE84-011103] N84-30267

Inductively stabilized, long pulse duration transverse discharge apparatus

[DE84-011301] N84-30281

Reflex ring laser amplifier system

[DE84-010874] N84-30282

Ceramic-glass-metal seal by microwave heating

[DE84-011283] N84-30295

Dual rotating shaft seal apparatus

[DE84-011101] N84-30307

Electric arc saw apparatus

[DE84-006153] N84-30308

Shock wave absorber having apertured plate

[DE84-011271] N84-30345

Method and apparatus for measuring stress

[DE84-011035] N84-30347

Proceedings of the DOE Physical and Chemical Energy Storage Annual Contractors' Review Meeting

[DE83-017536] N84-30540

Is the wind a practical source of energy for you?

[DE84-010938] N84-30541

Photovoltaics: Electricity from Sunlight, five-year research plan, 1984-1988

[DE84-010679] N84-30544

Dual aperture dipole magnet with second harmonic component

[DE84-011305] N84-30856

Biasing and fast degaussing circuit for magnetic materials

[DE84-011281] N84-30857

Thermoacoustic couple

[DE84-011296] N84-30895

X-ray beam finder

[DE84-011100] N84-30916

Method and source for producing a high concentration of positively charged molecular hydrogen or deuterium ions

[DE84-011030] N84-30918

Transverse field focused system

[DE84-011070] N84-30942

Omnidirectional fiber optic tiltmeter

[DE84-011109] N84-30959

Steady state compact toroidal plasma production

[DE84-011090] N84-30977

Silicon crystal growing by oscillating crucible technique

[DE84-011038] N84-31019

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).

Definition and layout of a traffic generator for an air traffic control simulation

[DFVLR-FB-84-15] N84-29862

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).

Optimization of a numerical method to calculate elliptic flows

[DFVLR-FB-84-16] N84-30252

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).

The DFVLR contrast transmittance model SCOTRAN-program system: Description and operating instruction

[DFVLR-FB-84-18] N84-30589

DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).

German-Argentinian R and D project for the utilization of wind energy

[BMFT-FB-T-84-080] N84-30549

DORTMUND UNIV. (WEST GERMANY).

Weak corrections to the e+e-yields mu+mu-asymmetry

[DO-TH-83-16] N84-30939

DOUGLAS AIRCRAFT CO., INC., LONG BEACH, CALIF.

Propulsion in a life-saving role for ACES 2 N84-29942

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.

Upset weld study for joining 304L stainless steel tubes

[DE84-011507] N84-30313

E

EAGLE-PICHER INDUSTRIES, INC., MIAMI, OKLA.

Trace analysis in quartz

[AD-A142425] N84-29988

EARTH SATELLITE CORP., CHEVY CHASE, MD.

Evaluation of LANDSAT-4 Thematic Mapper data as applied to geologic exploration: Summary of results N84-30412

EARTHQUAKE ENGINEERING RESEARCH INST., BERKELEY, CALIF.

Design considerations for shear links in eccentrically braced frames

[PB84-192186] N84-30136

Hybrid modeling of soil-structure interaction in layered media

[PB84-192178] N84-30137

Effects of bond deterioration on hysteretic behavior of reinforced concrete joints

[PB84-192020] N84-30343

Local bond stress-slip relationships of deformed bars under generalized excitations: Experimental results and analytical model

[PB84-192848] N84-30355

Interactive computer analysis methods for predicting the inelastic cyclic behaviour of structural sections

[PB84-192012] N84-30358

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (SWITZERLAND).

Aeroelasticity in turbomachine-cascades

[AD-A141905] N84-29880

Two-dimensional and quasi three-dimensional experimental standard configurations for aeroelastic investigations in turbomachine-cascades

[AD-A141904] N84-30297

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.

Joining silicon nitride based ceramics: A technical assessment

[DE84-011356] N84-30092

FORTRAN 8x: The scientific programming language of the future

[DE84-012526] N84-30787

EDUCATIONAL TESTING SERVICE, PRINCETON, N. J.

Speculations on the future of test design

[AD-A142662] N84-30699

ENERGETICS, INC., COLUMBIA, MD.

Survey and analysis of materials research and development at selected federal laboratories

[DE84-008904] N84-29967

ENERGY, MINES AND RESOURCES CANADA, OTTAWA (ONTARIO).

A preliminary assessment of LANDSAT-4 Thematic Mapper data N84-30377

ENERGY SYSTEMS GROUP, INC., ATLANTA, GA.

Simplified method for estimating the cooling loads of passive solar systems

[DE84-009474] N84-30538

SLR-PLUS version 1.0 reference manual

[DE84-009180] N84-30781

ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Anti-tampering and anti-misfueling programs to reduce in-use emissions from motor vehicles
[PB84-185222] N84-30559
ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Air pollution effects on aquatic ecosystems: Summary of a symposium
[PB84-185214] N84-30562
ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Scan-angle and detector effects in Thematic Mapper radiometry N84-30386
Thematic Mapper spectral dimensionality and data structure N84-30387
Investigation of radiometric properties of LANDSAT-4 MSS N84-30403
A description of the MIZEX 1984 remote sensing activities
[AD-A142296] N84-30514
Summary of SAR (Synthetic Aperture Radar) ocean wave data archived at ERIM (Environmental Research Institute of Michigan)
[AD-A142620] N84-30633
ENVIROSPHERE CO., ATLANTA, GA.
Delineation of wetland boundaries using vegetation within the Altamaha River Basin of Georgia
[AD-A142590] N84-30515
EROS DATA CENTER, SIOUX FALLS, S. DAK.
Geodetic accuracy of LANDSAT-4 Multispectral Scanner and Thematic Mapper data N84-30399
EUROPEAN SOUTHERN OBSERVATORY, MUNICH (WEST GERMANY).
Activities in astronomy
[ISSN-0531-4496] N84-31067
EUROPEAN SPACE AGENCY, FRASCATI (ITALY).
A preliminary analysis of LANDSAT-4 Thematic Mapper radiometric performance N84-30379
TM failed detectors data replacement N84-30382
Status of the ESA-Earthnet LANDSAT-4 TM ground processing chain N84-30391
EUROPEAN SPACE AGENCY, PARIS (FRANCE).
The Technical University of Denmark (TUD)-ESA spherical near field antenna test facility, Lyngby, Denmark
[ESA-BR-19] N84-29890
Dynamic synthesis and evaluation of spacecraft structures
[ESA-STR-208] N84-29904
European Space Tribology Laboratory: Facilities, services, capabilities
[ESA-BR-12] N84-30317
Scientific-Technical Facilities Department. Scientific-technical report
[ESA-TT-843] N84-31083
EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, NOORDWIJK (NETHERLANDS).
The evaluation and approval of automatic machine wave soldering for ESA spacecraft hardware
[ESA-PSS-01-707] N84-30215
EXECUTIVE OFFICE OF THE PRESIDENT, WASHINGTON, D. C.
Science and technology report to the Congress, 1982
[DE84-901150] N84-31040
EXIDE MANAGEMENT AND TECHNOLOGY CO., YARDLEY, PA.
Testing, data analysis and engineering services on lead-acid load leveling batteries
[DE84-011523] N84-30198

F

FAILURE ANALYSIS ASSOCIATES, PALO ALTO, CALIF.
Cost/risk analysis for disk retirement, volume 1
[AD-A141978] N84-29881
Techniques for fatigue life predictions from measured strains
[NASA-CR-171118] N84-30334
FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
The measurement of pilot performance: A master-journeyman approach
[AD-A142457] N84-30698
FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
FAA (Federal Aviation Administration) air traffic activity FY 1983
[AD-A142493] N84-29861
Report of accomplishments under the airport improvement program
[AD-A142444] N84-29889
FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
Gould Incorporated, Gould Concept 32/87, COBOL Release 1.4
[PB84-180249] N84-30796
FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
Automatic beam centering at the SSC interaction regions
[DE84-010710] N84-30902
FLOWPOWER, INC., HUNTINGTON STATION, N.Y.
High yield wind energy resources in the mid-Hudson River basin
[PB84-184951] N84-30530
FORD AEROSPACE AND COMMUNICATIONS CORP., PALO ALTO, CALIF.
The liquid bipropellant stage concept: Filling the OTV gap N84-29938
FORSCHUNGSINSTITUT FUER HOCHFREQUENZPHYSIK, WERTHHOVEN (WEST GERMANY).
Backscatter measurements on snow covered terrain at 94 GHz
[REPT-4-84] N84-30144
FRANKLIN RESEARCH CENTER, PHILADELPHIA, PA.
Chronic effects of repeated mechanical trauma to the skin: A description of the problem in the workplace
[PB84-181767] N84-30695
FRAUNHOFER-INST. FUER ATMOSPHAERISCHE UMWELTFORSCHUNG, GARMISCH-PARTENKIRCHEN (WEST GERMANY).
Scientific analysis of existing data on aerosol dispersion and transport in a mountain valley
[AD-A142013] N84-30555
FUJIKURA LTD., SAKURA (JAPAN).
Research and development of long heat pipes and their applications N84-30126

G

GA TECHNOLOGIES, INC., SAN DIEGO, CALIF.
Reduced equations in three dimensional geometry
[DE84-009401] N84-30841
Density variation due to wave heating in Tokamak plasmas
[DE84-009402] N84-30993
GARRETT CORP., PHOENIX, ARIZ.
A turbomechanical thrust vector control for advanced intercontinental ballistic missiles N84-29953
GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
The changing airline industry: A status report through 1982
[GAO/RCED-83-179] N84-29858
Federal Aviation Administration's system for prioritizing airport grants
[PB84-181650] N84-29893
National Aeronautics and Space Administration's first-year implementation of the Federal Managers' Financial Integrity Act
[PB84-188770] N84-31044
GENERAL ATOMIC CO., SAN DIEGO, CALIF.
The 3-D MHD stability of high-beta free-boundary Tokamak plasmas with finite edge-pressure-gradient and limiter stabilization
[DE84-009186] N84-30976
GENERAL DYNAMICS CORP., FORT WORTH, TEX.
Durability methods development, volume 7
[AD-A142400] N84-29865
USAF durability design handbook: Guidelines for the analysis and design of durable aircraft structures
[AD-A142424] N84-29866
Adhesive bond and composite strength screening system developmental study
[FZM-7184] N84-30073
GENERAL ELECTRIC CO., LANHAM, MD.
Thematic Mapper Image Processing System (TIPS) processing status N84-30368
LANDSAT-4 MSS geometric correction: Methods and results N84-30409
GENERAL ELECTRIC CO., PHILADELPHIA, PA.
LANDSAT-4 system description N84-30361
An overview of the Thematic Mapper geometric correction system N84-30367
GEOLOGICAL SURVEY, BOSTON, MASS.
Water resources data for Massachusetts and Rhode Island, water year 1982
[PB84-180009] N84-30521
GEOLOGICAL SURVEY, FLAGSTAFF, ARIZ.
Intraband radiometric performance of the LANDSAT-4 Thematic Mapper N84-30389
Tests of low-frequency geometric distortions in LANDSAT-4 images N84-30397
GEOLOGICAL SURVEY, LITTLE ROCK, ARK.
Water resources data for Arkansas, water year 1982
[PB84-181296] N84-30522
GEOLOGICAL SURVEY, MENLO PARK, CALIF.
Stratigraphic and volcano-tectonic relations of Crater Flat Tuff and some older volcanic units, Nye County, Nevada
[DE84-010926] N84-30584
MULAP4: A multi-linear analysis program for ground motion studies of horizontally layered systems
[PB84-182815] N84-30591
GEOLOGICAL SURVEY, RESTON, VA.
Analysis of LANDSAT-4 TM data for lithologic and image mapping purpose N84-30390
GEOLOGICAL SURVEY, TUSCALOOSA, ALA.
Water resources data for Alabama, water year 1982
[PB84-183250] N84-30523
GEOLOGICAL SURVEY, WOODS HOLE, MASS.
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 1: Executive summary
[PB84-187939] N84-30639
Environmental geologic studies on the United States mid- and north Atlantic outer continental shelf area, 1980-1982. Volume 2: Mid-Atlantic region
[PB84-187947] N84-30640
Environmental geologic studies on the United States mid-and north Atlantic outer continential shelf area, 1980-1982. Volume 3: North Atlantic region
[PB84-187954] N84-30641
GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
A steady-state version of a dynamic optimal budgeting problem
[AD-A142281] N84-31034
GEORGIA INST. OF TECH., ATLANTA.
Interference drag in a simulated wing-fuselage juncture
[NASA-CR-3811] N84-29853
A procedure for designing exact reconstruction filter banks for tree-structured subband coders
[AD-A142345] N84-30150
A review of the literature on training simulators. Translators: Transfer of training and simulator fidelity
[AD-A142732] N84-30700
Spectral and invertibility properties of band matrices
[AD-A142637] N84-30831
Rotation and impurity transport in a Tokamak plasma with directed neutral beam injection
[DE84-008014] N84-30996
GEORGIA UNIV., ATHENS.
Geometric accuracy of LANDSAT-4 MSS image data N84-30406
GTE SYSTEMS GROUP, PHOENIX, ARIZ.
DCP (Distributed software engineering control process): Experience in bootstrapping an Ada (trademark) environment
[AD-P003424] N84-30756

H

HAMPTON INST., VA.
Teaching Ada (trademark) at Hampton Institute
[AD-P003420] N84-30752
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Ring ductility of irradiated Inconel 706 and Nimonic PE16
[DE84-010397] N84-30034
Transmutation of manganese: Substituted steels in STARFIRE
[DE84-010402] N84-30035
Strategies for analytical applications and implementation of a multi-purpose laboratory robot
[DE84-012379] N84-30314
HARRIS CORP., MELBOURNE, FLA.
Experience with Ada (trademark) for the Graphical Kernel System
[AD-P003426] N84-30758
Ada (trademark) design language concerns
[AD-P003431] N84-30763
HARRY DIAMOND LABS., ADELPHI, MD.
Rare-earth ion-host lattice interactions: 15. Analysis of the spectra of Nd3+ in Gd3Sc2Ga3O12
[AD-A142555] N84-31015
HOECHST A.G., GENDORF (WEST GERMANY).
Fluorothermoplastics for long life, weatherproof composites
[BMFT-FB-T-84-082] N84-30096
HONEYWELL ELECTRO-OPTICS CENTER, LEXINGTON, MASS.
Holographic FLI for detection of defects
[AD-A142733] N84-30258
HONEYWELL, INC., BLOOMINGTON, MINN.
Study of mechano-chemical machining of ceramics and the effect on thin film behavior
[AD-A142542] N84-30080

HUGHES AIRCRAFT CO., FULLERTON, CALIF.

An Ada (trademark) network: A real-time distributed computer system
[AD-P003423] N84-30755

HUGHES AIRCRAFT CO., LOS ANGELES, CALIF.

Kevlar-49/epoxy case skirt structural fatigue strength
N84-29955

HUGHES RESEARCH LABS., MALIBU, CALIF.

Phase conjugate optics
[AD-A141960] N84-30951

I

IAP RESEARCH, INC., DAYTON, OHIO.

Optimization of electromagnetic propulsion systems
N84-29929

IDAHO UNIV., MOSCOW.

Thermal ground water flow systems in the thrust zone in southeastern Idaho
[DE84-011598] N84-30517

In-stream distribution and hydraulic and ecological effects of volcanic ash from Mount St. Helens eruption
[PB84-169382] N84-30526

IIT RESEARCH INST., CHICAGO, ILL.

Simulation of powder distribution in IITRI bag experiments
[AD-A141941] N84-30128

ILLINOIS STATE WATER SURVEY, CHAMPAIGN.

Studies of statistical techniques to evaluate weather modification. Volume 1: Reports of OSET
[PB84-182906] N84-30620

ILLINOIS UNIV., CHICAGO.

Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets
N84-29963

ILLINOIS UNIV., URBANA.

Formation of dispersions of rare earth oxides in titanium alloys using rapid solidification processing
[DE84-008664] N84-30048

Experimental studies of laterally seeded recrystallized polysilicon on silicon dioxide
[AD-A142382] N84-30077

The missing cone problem in computer tomography and a model for interpolation in synthetic aperture radar
[AD-A142421] N84-30157

Performance of digital communications over selective fading channels
[AD-A142427] N84-30158

A simulation program with latency exploitation for the transient analysis of digital circuits
[AD-A142377] N84-30181

Modeling and extraction of interconnect parameters in very-large-scale integrated circuits
[AD-A142381] N84-30182

A minimum area VLSI (Very Large Scale Integrated) architecture for O(logn) time sorting
[AD-A142414] N84-30723

Analysis and control of a class of stiff linear distributed systems
[AD-A142364] N84-30821

A numerical algorithm for chained aggregation and modified chained aggregation
[AD-A142394] N84-30822

New algorithms for near neighbor searching
[AD-A142404] N84-30824

The complexity of sorting on distributed systems
[AD-A142415] N84-30825

Diffusion and electrical properties of sulfur implanted in gallium arsenide
[AD-A142405] N84-31012

Fun with supersymmetric quantum mechanics
[DE84-011329] N84-31031

ILLINOIS UNIV., URBANA-CHAMPAIGN.

Theory of the electronic structure and optical properties of organic solids: Exciton effects
[AD-A142544] N84-29993

Wave attenuation and mode dispersion in a waveguide coated with lossy dielectric material
[NASA-CR-173820] N84-30145

On fixed-interval minimum symbol error probability detection
[AD-A142465] N84-30849

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).

Progress in the development of an intermittency model of turbulence
[CFD/83/7] N84-30255

Prediction of the temperature characteristics in intermittent, free turbulent shear layers
[CFD/84/1] N84-30256

INDIANA UNIV., BLOOMINGTON.

Indiana University Theoretical Particle Physics Group
[DE84-010593] N84-30903

INSTITUT D'AERONOMIE SPATIALE DE BELGIQUE, BRUSSELS.

On molecular scattering in the terrestrial atmosphere: An empirical formula for its calculation in the homosphere
[AERONOMICA-ACTA-A-284-1984] N84-30564

Trace constituents measurements deduced from spectrometric observations onboard Spacelab
[AERONOMICA-ACTA-A-286-1984] N84-30565

INSTITUT FUER ANGEWANDTE GEODAESIE, FRANKFURT AM MAIN (WEST GERMANY).

Reports on cartography and geodesy. Series 1: Original reports, number 92
[ISSN-0469-4236] N84-30495

DIGMAP, an interactive graphic support system for mine survey N84-30496

Automatic symbol generating for topographic maps using raster data processing following the example of the general topographic map 1:200,000 (TUEK 200)
N84-30497

Application of FASTRAK by Skandinavisk Autodigitaliserings AB (SADAB) cartographic service
N84-30498

COMEDG: A program to combine logically independent line segments into geometrically coherent lines
N84-30499

Automation assisted gathering, processing, and representation of topographic data for the production of the German basic map 1:5000 - height in Lower Saxony
N84-30500

Forest generalization by digital raster data processing
N84-30501

Cooperative line extraction of aerial photos and maps
N84-30502

Software research for computer aided cartography at the Berlin Technical University N84-30503

An example of computer aided generalization of TK 25 N84-30504

An investigation of the reproduction of the general topographic map 1:200,000 in shortened scale with a digital raster data processing system N84-30505

A system for automatic digitization of cartographic line drawings N84-30506

Raster processing for regional planning tasks
N84-30507

The automated cadastral plan, a source for the topographic country map works N84-30508

Suggestion for a cartographic pattern recognition system using digital raster data processing methods
N84-30509

INSTITUT ROYAL METEOROLOGIQUE DE BELGIQUE, BRUSSELS.

Publications N84-30594

INSTITUTE FOR DEFENSE ANALYSES, ALEXANDRIA, VA.

AN/APN-128 Lightweight Doppler Navigation System (LDNS) case study report (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142072] N84-29860

F-15 AN/APG-63 radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142071] N84-29873

F-16 APG-66 fire control radar case study report IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142075] N84-29874

R and M (Reliability and Maintainability) program review elements document (IDA/OSD R and M (Institute for Defense Analyses/Office of the Secretary of Defense Reliability and Maintainability) study
[AD-A142073] N84-30322

INSTITUTE FOR PERCEPTION RVO-TNO, SOESTERBERG (NETHERLANDS).

Selection of elements in process schemes on Cathode Ray Tube (CRT). A comparative study between four types of trackballs
[IZF-1984-4] N84-30213

Orientation of ergonomic aspects of the Universal Dynamometer Device
[IZF-1983-25] N84-30315

INSTITUTE FOR TELECOMMUNICATION SCIENCES, BOULDER, COLO.

The evaluation of prediction models for microwave attenuation by rainfall
[PB84-182104] N84-30170

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, NEW YORK, N.Y.

IEEE Transactions on Nuclear Science. Volume NS-30, no. 4, part 2: 1983 Particle Accelerator Conference
[DE84-007400] N84-30914

INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.

Effects of H2S on molten carbonate fuel cells
[DE84-010485] N84-30531

INSTITUTE OF OCEANOGRAPHIC SCIENCES, WORMLEY (ENGLAND).

King's Trough Flank: Geological and geophysical investigations of its suitability for high-level radioactive waste disposal
[IOS-166] N84-30950

INSTITUTE OF SPACE AND ASTRONAUTICAL SCIENCE, TOKYO (JAPAN).

An MPD thruster with liquid metal injection
[ISAS-610] N84-30103

Proceedings of the Symposium on Mechanics for Space Flight
[ISAS-SP-2] N84-30114

Numerical simulation of autorotation N84-30118

A numerical study of artificial electron aurora experiments
[ISAS-611] N84-30568

Derivation of crustal magnetic anomalies from MAGSAT
[REPT-609] N84-30569

Experimental study on porous-plug phase separator for superfluid He2
[ISAS-612] N84-31008

INTEGRATED SYSTEMS, INC., PALO ALTO, CALIF.

Canonical realizations of completely regular modular computing networks
[AD-A142010] N84-30802

INTELLIMAC, INC., ROCKVILLE, MD.

Ada (trademark) for business and other non-DOD applications
[AD-P003425] N84-30757

INTERMETRICS, INC., CAMBRIDGE, MASS.

Learning the Ada (trademark) integrated environment
[AD-P003417] N84-30749

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.

Weather summaries for Coram Experimental Forest, Northwestern Montana: An international biosphere reserve
[PB84-182443] N84-30615

INTERNATIONAL BUSINESS MACHINES CORP., PALO ALTO, CALIF.

LANDSAT-4 radiometric and geometric correction and image enhancement results N84-30370

IOWA UNIV., IOWA CITY.

Testament of general boundary conditions and point-wise state variable constraints in optimum design for static and dynamic response
[PB84-192749] N84-30356

Soliton collapse during ionospheric heating
[DE84-009994] N84-30576

Theoretical aspects of mirror fusion
[DE84-009139] N84-30988

ISTITUTO SUPERIORE DI SANITA, ROME (ITALY).

Preliminary result of our new Nationwide Evaluation of X-ray Trends (NEXT) program for Italy
[ISS-L-84/3] N84-30693

J

JAPAN BROADCASTING CORP., TOKYO.

A method of measuring distortion noise in digital audio equipment
[NHK-LABS-NOTE-299] N84-30174

Two-way unidirectional condenser microphone
[NHK-LABS-NOTE-297] N84-30175

JAYCOR, SAN DIEGO, CALIF.

Theoretical studies of Elma Bumpy Torus (EBT)
[DE84-010814] N84-30978

JERSEY CITY STATE COLL., N. J.

Experiences in teaching Ada (trademark)
[AD-P003419] N84-30751

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.

Very low thrust and low chamber pressure GO2/GH2 thruster technology N84-29910

A study of methods for alleviation of flow decay risk to the Galileo spacecraft N84-29919

Purification of nitrogen tetroxide for long-term reliability
N84-29920

Stress-corrosion crack-growth study of titanium alloy Ti-6Al-4V exposed to Freon PCA and nitrogen tetroxide MON-1 N84-29923

Cost evaluation of space station propulsion system options N84-29932

An integrated space station propulsion system
N84-29933

Oxygen/hydrogen thrusters for the space station auxiliary propulsion systems N84-29934

Thrust level requirements for space station on-orbit propulsion N84-29935

Dual arm master controller concept: Consolidated fuel reprocessing program [NASA-CR-173843] N84-30296

An analysis LANDSAT-4 Thematic Mapper geometric properties N84-30392

Preliminary geologic/spectral analysis of LANDSAT-4 Thematic Mapper data, Wind River/Bighorn basin area, Wyoming N84-30413

Data integrity factors affecting the construction of the mapping, charting, and geodesy data base [NASA-CR-173835] N84-30511

JOHNS HOPKINS UNIV., BALTIMORE, MD.

A new optical technique for rapid determination of creep and fatigue thresholds at high temperature [AD-A142675] N84-30341

JOHNS HOPKINS UNIV., SHADYSIDE, MD.

Chesapeake Bay nutrient dynamics study [PB84-190982] N84-30524

JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.

USSR report: Earth sciences [JPRS-UES-84-006] N84-30479

Inevitable climatic changes N84-30480

Results of ocean-atmosphere interaction studies in West Atlantic N84-30481

Spatial distribution of advective heat influxes in atmosphere over Northern Hemisphere and its relationship to heat influxes from ocean N84-30482

Dependence of crustal structure of eastern Pacific Ocean on its age N84-30483

Structure of ocean floor in relation to conditions for formation of lithosphere N84-30484

Developments of research on prediction of earthquakes, tsunami and volcanic eruptions in Far East N84-30485

Interpreting three-dimensional gravitational and magnetic anomalies N84-30486

Changes in Earth's rotation rate caused by zonal tide and their manifestations in atmospheric pressure field N84-30487

Quasi-two-day variation of lower thermosphere wind velocities N84-30488

Stability criterion for moist compressible atmosphere and energy conditions for development of convective cloud cover: Numerical experiment N84-30489

Effect of antiscreening of outgoing thermal radiation by cloud cover N84-30490

Accuracy of one approximate method for computing radiative fluxes in presence of broken clouds N84-30491

Small-angle method in study of single and multiple scattering N84-30492

Resonance absorption of narrow-band laser radiation by atmospheric gases N84-30493

Interpreting spectra of sea surface aerial photographs N84-30494

USSR report: Space Biology and Aerospace Medicine, vol. 18, no. 3, May - June 1984 [JPRS-USB-84-005] N84-30642

Use of vitamins during adaptation to high altitudes N84-30643

Reliability and efficiency of Kubicek rheographic method for monitoring cardiac output and stroke volume N84-30644

Walking erect as a factor in development of arterial hypertension in primates N84-30645

Effect of dihydroergotamine on human circulation during orthostatic tests N84-30646

Circulatory changes in orthostatic position in the presence of hyperthermia N84-30647

Blood plasma free amino acids under hypokinetic conditions N84-30648

Human stomach motor and evacuatory functions during antiorthostatic hypokinesia N84-30649

Circadian pattern of simian functional parameters during hypokinesia and in the recovery period N84-30650

Dynamics of red blood cell changes in rats during acute immobilization N84-30651

Ultrasound distribution and bone calcium content in experimental animals submitted to hypokinesia and weightlessness N84-30652

Ultrasonography of canine soft tissues during decompression N84-30653

Functional state and work capacity of man when breathing oxygen and hypoxic mixtures under positive pressure N84-30654

Adrenal-hypothalamus-pituitary system reactions in rats cooled in a hypoxic-hypercapnic gas atmosphere N84-30655

Exchange of gases and physical work capacity in natives of different geographic regions N84-30656

Rat behavior in selection of negative stimulus: Pain or exposure to electromagnetic field N84-30657

Effect of high ammonia content in pressure chamber atmosphere on human adrenocortical system function N84-30658

Effect of living conditions in confined space on formation of bacterial aerosol N84-30659

Nomogram for demonstrating change in central venous and pulmonary artery pressure during decompression of different parts of the body N84-30660

Dependence of blood coagulating and fibrinolytic systems on functional state of lysosomal system of neutrophil leukocytes during exposure of the body to low barometric pressure N84-30661

Simulation of physiological effects of negative pressure on man N84-30662

Individual distinctions of human sleeping respiration at altitude of 4200 meters N84-30663

USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-84-016] N84-30675

Engineering physiology: New area for use of control theory N84-30676

Bilateral carotid ligation and effects of electromagnetic field on conditioned reflex retention and cerebral nucleic acid levels N84-30677

Time-dependent spinal cord changes following nonionizing microwave irradiation N84-30678

Effect of constant and low-frequency magnetic fields on biological systems N84-30679

Dissociation of amino acid-DNA complexes under influence of long-wave UV light N84-30680

Reactions of cerebral cortex neurons to alternating magnetic field on glutamic acid N84-30681

Influence of microwave electromagnetic radiation and certain hormones on osmotic resistance of mouse erythrocytes N84-30682

USSR report: Physics and mathematics [JPRS-UPM-84-001] N84-30862

Excitation of sound by light N84-30863

Use of Peltier effect for small signal amplification and conversion N84-30864

Detecting optical polarization of nuclei in semiconductors with super-conducting quantum interferometer N84-30865

New phase transition in Si and GaAs exposed to picosecond laser pulses N84-30866

Impact of weak electric field on photoconductivity of modified vitreous As2Se3 N84-30867

Impact of laser radiation on optical properties of polymer liquid crystal in phase transition range N84-30868

Noncubic magnetic anisotropy in YSmLuCaFeGe garnet films N84-30869

Polarization of paraexciton luminescence in Cu2O crystals in magnetic field N84-30870

Electron-microscopic microstructural examination of glassy Ge-Se semiconductors N84-30871

Instability of collapsing cylindrical shell during magnetic energy density N84-30872

Excitation of quasi-static magnetic fields in axial structures N84-30873

Inertial and shear flow N84-30874

New lasing ferroelectric material Pb5Ge3O11-Nd-3(+) N84-30875

High-Q open resonator structures with sparse spectrum N84-30876

Plasma in diverter during intense recycling N84-30877

Dynamics of plasma corona on spherical targets irradiated by laser N84-30878

Heating and implosion of spherical targets irradiated by laser N84-30879

Control computer and automation subsystem equipment in Delfin Facility N84-30880

Studies of amplifier module in Delfin Facility for heating thermonuclear plasma N84-30881

Holographic image subtraction by recording in Fourier plane and space filtration with thin light beam N84-30882

Microspectrophotometer for crystal analysis by absorption reflectometry N84-30883

Nature of polarized vibronic sidebands of biexciton absorption in Alpha-oxygen N84-30884

K

KAKIOKA MAGNETIC OBSERVATORY (JAPAN).

Report of the geomagnetic and geoelectric observations, 1982 (rapid variations) [KMO-23] N84-30567

KANSAS UNIV., LAWRENCE.

Nordsee radar backscatter measurements data report [AD-A141914] N84-30148

KELVINATOR COMPRESSOR CO., GRAND RAPIDS, MICH.

Research and development of energy-efficient high back-pressure compressor [DE84-011827] N84-30131

KEMA (N. V.), ARNHEM (NETHERLANDS).

Corrosion of unalloyed steels in different alkaline solutions at high temperatures and under high pressures [S/T-REPT-VOL-1-NO-1] N84-30060

Resonance in the water circuit of a cooling tower [S/T-REPT-VOL-1-NO-2] N84-30254

Neutron embrittlement of the reactor vessel in Borssele as determined from Charpy specimens [S/T-REPT-VOL-1-NO-4] N84-30352

Environmental effects of increasing the amount of district heating in the Netherlands [S/T-REPT-VOL-1-NO-5] N84-30558

Human reliability analysis using event trees [S/T-REPT-VOL-1-NO-3] N84-30718

KMS FUSION, INC., ANN ARBOR, MICH.

Coated silica shells: An advanced hydrogen storage system [DE84-006986] N84-30068

Holographic interferometry using 20-picosecond UV pulses to obtain time resolved hydro measurements of selenium and gold plasmas [DE84-009485] N84-30269

Experiments and theory on half-harmonic light and 2-plasmon decay [DE84-006945] N84-30276

VUV instrument calibrations for laser-plasma studies [DE84-010507] N84-30974

KYOTO UNIV. (JAPAN).

Freejets of rotationally relaxing diatomic gases N84-30119

Visualization for a free jet by a laser induced fluorescence method and its structure N84-30120

L

LABORATOIRE DE METEOROLOGIE DYNAMIQUE, PARIS (FRANCE).

Calibration of TM data from ground-based measurements N84-30385

LABORATORY FOR ELECTRONIC DEVELOPMENT OF THE ARMED FORCES, OEGSTGEEST (NETHERLANDS).

Inventory RF radiation levels in the Netherlands, part 1 [LEOK-TR-1984-02-PT-1] N84-30167

Description of a microwave system for the measurement of close to carrier AM and FM noise spectra [LEOK-TR-1984-04] N84-30168

LANGUAGE SERVICES, KNOXVILLE, TENN.

Calculation of ballistic focusing of ion beams [DE84-012870] N84-30934

LEADERSHIP AND MANAGEMENT DEVELOPMENT CENTER, MAXWELL AFB, ALA.

A field study of Air Force organization structures [AD-A142389] N84-31035

LEHIGH UNIV., BETHLEHEM, PA.

Analysis of fracture modes during extrusion and drawing of bimetal rods or wire [DE84-009849] N84-30051

Characterization of block copolymers based on poly(3,3 -bis(ethoxymethyl)oxetane) and other novel polyethers [AD-A142806] N84-30081

LINKOEPING UNIV. (SWEDEN).

The photoelectrochemistry of conducting polymers [DE84-010889] N84-30093

LOCKHEED-CALIFORNIA CO., BURBANK.

A study of stiffness, residual strength and fatigue life relationships for composite laminates [NASA-CR-172211] N84-29978

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.

Investigation of TM band-to-band registration using the JSC registration processor N84-30398

Preliminary evaluation of Thematic Mapper image data quality N84-30415

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.

Strategic blue-green communication filters [AD-A142353] N84-30151

LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.

Multi-100kW: Planar low cost solar array development [NASA-CR-171119] N84-30529

LORD CORP., ERIE, PA.

Active attenuation of propeller blade passage noise [NASA-CR-172386] N84-30686

LOS ALAMOS SCIENTIFIC LAB., N. MEX.

Ceramics for fusion devices [DE84-011409] N84-30082

Practical aspects of tuning a ringed RFQ [DE84-011366] N84-30163

General-purpose RFQ design program [DE84-011327] N84-30165

Diagnostics of a high current capillary discharge [DE84-011369] N84-30194

Electronics Division research and development
[DE84-011024] N84-30200

Some considerations on silicone oil in high-current and energy-disconnecting mechanisms
[DE84-011021] N84-30203

Electron velocity distributions near collisionless shocks
[DE84-011352] N84-30235

Dust particles in high speed flows: Calculations of small particle reentry hydrodynamics
[DE84-010986] N84-30245

Heat pipe technology issues
[DE84-011364] N84-30248

New experimental techniques with the split Hopkinson pressure bar
[DE84-003818] N84-30268

Free electron lasers and related topics
[DE84-011332] N84-30277

Electron beam diagnostic for the Los Alamos free electron laser oscillator experiment
[DE84-011346] N84-30278

The XUV/VUV free-electron laser oscillator
[DE84-011347] N84-30279

Exploration of phase stability in the surfatron accelerator
[DE84-011416] N84-30280

Inductively stabilized excimer lasers
[DE84-011371] N84-30284

Efficient forward conversion in a Raman generator
[DE84-007466] N84-30285

A convective mechanism for inhibition of heat conduction in laser produced plasmas
[DE84-011336] N84-30289

Criterion for quasibrittle crack growth
[DE84-010052] N84-30349

Economics of a conceptual 75 MW hot dry rock geothermal electric power station
[DE83-015926] N84-30539

Investigation of laminar shocks
[DE84-010074] N84-30582

Evolution of structure in the PLACES barium clouds
[DE84-010986] N84-30583

Some physical concepts in complex terrain meteorology derived from the Department of Energy's ASCOT program
[DE84-010059] N84-30607

Interfacing CAMAC to a high-speed multiprocessor bit slice data-acquisition system
[DE84-009986] N84-30780

Current research in parallel microprocessing systems at Los Alamos
[DE84-011342] N84-30804

Intelligent optical design program
[DE84-010071] N84-30813

Hamiltonian structure of field-line equations
[DE84-011019] N84-30836

An improved accuracy general remapping algorithm
[DE84-004320] N84-30837

MHD equilibrium and stability of rotating FRCs with excluded multipole fields
[DE84-007477] N84-30853

Internal magnetic field measurements in a translating field-reversed configuration
[DE84-010054] N84-30854

Institutional supporting research highlights in physics and mathematics, fiscal year 1983
[DE84-011025] N84-30855

Commissioning tests of the Bonneville Power Administration 30 MJ superconducting magnetic energy storage unit
[DE84-006033] N84-30860

Electron motion in solenoidal magnetic fields using a first order symplectic integration algorithm
[DE84-011341] N84-30910

New directions in linear accelerators
[DE84-011412] N84-30911

RFQ radial matching sections and fringe fields
[DE84-011408] N84-30920

Pion elastic and inelastic scattering from (40) (42) (44) (48)Ca and (54)Fe
[DE84-009080] N84-30927

Space nuclear safety program
[DE84-011015] N84-30943

High energy nuclear structures
[DE84-010062] N84-30947

Generalized Poisson brackets and nonlinear Liapunov stability: Application to reduced MHD
[DE84-009973] N84-30972

Lyapunov stability conditions for a relativistic multifluid plasma
[DE84-010004] N84-30973

Equilibrium and stability of the Los Alamos spheromak
[DE84-010064] N84-30975

Ion reflection, gyration, and dissipation at supercritical shocks
[DE84-011353] N84-30980

Space resolved absolutely calibrated VUV spectroscopic measurements on CTX
[DE84-007490] N84-30984

Mixed mode operation in CTX
[DE84-007493] N84-30985

Ohmic heating to 100-eV and helicity injection in CTX
[DE84-007494] N84-30986

Confinement time and energy balance in the CTX spheromak
[DE84-007491] N84-30987

Analysis of surface currents on the CTX mesh flux conserver
[DE84-007491] N84-30989

Two novel plasma diagnostics
[DE84-009970] N84-30990

Plasma simulation studies of electron acceleration for beat wave and single frequency-laser heating schemes
[DE84-009988] N84-30992

The 19th Moriond meeting: Summary talk
[DE84-010053] N84-31072

The galactic acceleration of ultrahigh energy cosmic rays
[DE84-012442] N84-31080

Photon losses in cosmic ray acceleration in active galactic nuclei
[DE84-012583] N84-31081

LOUGHBOROUGH UNIV. OF TECHNOLOGY (ENGLAND).

Inference based on ranks with multiple failure time or grouped survival data
[MATHS-RES-177] N84-30324

Formulation of stiffness matrices for elastic buckling of thin-walled open section prismatic columns
[TT-8402] N84-30353

LOWELL OBSERVATORY, FLAGSTAFF, ARIZ.

The occultation of AG+29 deg 398 by 98 Minerva
[NASA-CR-173827] N84-31066

M

MADISON MAGNETICS, INC., WIS.

Magnetic suspension and balance system study
[NASA-CR-3802] N84-29888

MARQUARDT CORP., VAN NUYS, CALIF.

Low thrust bipropellant engine development
N84-29912

Firebolt derivative/ramjet engine feasibility investigation (core engine program): Program summary N84-29962

MARTIN MARIETTA AEROSPACE, DENVER, COLO.

Hydrogen fluoride formation and metal corrosion in freon-contaminated propellants N84-29921

MPD thruster comparisons with advanced chemical systems for auxiliary propulsion applications
N84-29928

MARYLAND UNIV., COLLEGE PARK.

Acceleration of ions and electrons by wave-particle interactions
[AD-A142341] N84-30900

New approach to polarized proton scattering based on Dirac dynamics
[DE84-006018] N84-30926

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.

Decentralized estimation in communication networks with delay
[AD-A142376] N84-30155

Parallelism in manipulator dynamics. Revision
[AD-A142515] N84-30299

European views on controlling acid rain
[PB84-194206] N84-30563

Using chemically reactive tracers to determine temperature characteristics of geothermal reservoirs
[DE84-011373] N84-30580

Mechanisms of interannual ocean-atmosphere interactions
[NASA-CR-173834] N84-30595

PRISM: A practical real-time imaging stereo matcher
[AD-A142532] N84-30686

Computational experiments with a feature based stereo algorithm
[AD-A142549] N84-30687

Interaction of human cognitive models and computer-based models in supervisory control
[AD-A142677] N84-30717

An algorithm for parsing flow graphs
[AD-A142440] N84-30773

Some design guidelines and discrete-time adaptive controllers
[NASA-CR-173800] N84-30808

Design issues in parallel architectures for artificial intelligence
[AD-A142482] N84-30809

Artificial intelligence and robotics
[AD-A142488] N84-30810

Smoothed local symmetries and their implementation
[AD-A142489] N84-30811

The curvature primal sketch
[AD-A142480] N84-30827

Switchable zero order diffraction gratings as light valves
[AD-A142513] N84-30953

Linear theory of lower hybrid heating
[DE84-010577] N84-30979

Lower hybrid experiments at the 1 MW level on Alcator C: Heating and current drive
[DE84-010586] N84-30981

Realistic modelling of lower hybrid current drive with multiple codes
[DE84-010576] N84-30982

Plasma Fusion Center technical research programs
[DE84-007954] N84-30983

MASSACHUSETTS UNIV., AMHERST.

Uniaxial draw of poly(ethylene oxide) by solid state extrusion
[AD-A141923] N84-30074

Crystalline-state extrusion of low density polyethylenes
[AD-A142017] N84-30075

MATERIALS RESEARCH LABS., MELBOURNE (AUSTRALIA).

The effect of injection molding processing parameters on the environmental stress cracking resistance of polycarbonate moldings
[MRL-R-924] N84-30332

MAX-PLANCK-INSTITUT FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).

The Optical Coincidence Information Retrieval system (OCIR)
[MPAE-L-66-84-10] N84-31059

MAX-PLANCK-INSTITUT FUER PLASMAPHYSIK, GARCHING (WEST GERMANY).

Ring-type support concept for twisted coils (finite element simulation)
[IPP-2/271] N84-30327

Semi-implicit method for three-dimensional compressible MHD simulation
[IPP-6/234] N84-30961

The use of isotopically-enriched carbon probes for erosion deposition measurements in the ASDEX divertor
[DE84-012329] N84-31006

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).

Investigation of laser induced radical reactions using time resolved infrared and coherent anti-Stokes Raman scattering (CARS) spectroscopy
[MPIS-17/1983] N84-30008

Detection of NH-2O-radicals by far-infrared laser magnetic resonance spectroscopy
[MPIS-6/1984] N84-30010

Measurements of integral state-specific cross sections of inelastic collisions between NO and noble gases
[MPIS-18/1983] N84-30935

Scattering experiments on rotational excitation of methane in collision with noble gases
[MPIS-3/1984] N84-30936

MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON BEACH, CALIF.

Fluidic thrust vector control thruster development
N84-29940

MEGAPULSE, INC., BEDFORD, MASS.

An experimental investigation of the improvement in the reception of TM (Transverse Magnetic)-polarized LF (Low-Frequency) waves with a two-element spaced array
[AD-A142478] N84-30159

MERIDIAN CORP., FALLS CHURCH, VA.

Ocean Energy Technology Program
[DE84-012052] N84-30542

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., BREMEN (WEST GERMANY).

Development of a 6-component balance for the cryogenic range
[BMFT-FB-W-84-022] N84-30270

MIAMI UNIV., CORAL GABLES, FLA.

Numerical and analytical studies of steady detonation waves with expansion losses
[AD-A142601] N84-30232

MICHIGAN UNIV., ANN ARBOR.

Large-signal characterization of nonlinear two-port active networks
[AD-A142462] N84-30184

Lossless symmetric TEM line IMPATT diode power combiners
[AD-A142599] N84-30187

Characterization of real-time computers
[NASA-CR-3807] N84-30801

A model of inter-organizational influences on organizational processes
[AD-A142450] N84-31037

MIDWEST RESEARCH INST., GOLDEN, COLO.
Survey of the preparation, purity, and availability of silanes
[DE84-000090] N84-30084
Requirements for high-temperature air-cooled central receivers
[DE84-000081] N84-30534
Performance tests of the Solar Steam, Incorporated, 9-m deep-dish solar concentrating collector
[DE84-000079] N84-30535
Photo/Biological Hydrogen Principal Investigators Review Meeting: Proceedings of the May 1983 Program Review
[DE84-000083] N84-30538
Technical and cost potential for lightweight, stretched-membrane heliostat technology
[DE84-004433] N84-30543
Sunlight probability data for select cities in the US
[DE84-000006] N84-30605
Selected bibliography of solar thermal literature. Volume 1: Bibliography
[DE84-011386] N84-31052
Solar Radiation Data Directory: A guide to solar radiation and meteorological data collection activities in the US
[DE84-000095] N84-31057
MILITARY ACADEMY, WEST POINT, N. Y.
Teaching Ada (trademark) at the US Military Academy
[AD-P003418] N84-30750
MINNESOTA UNIV., MINNEAPOLIS.
Vertebrate behavior and ecology
[DE84-007318] N84-30673
MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Generalized roughness effects on turbulent boundary layer heat transfer. A discrete element predictive approach for turbulent flow over rough surfaces
[AD-A141943] N84-30227
MISSOURI UNIV., KANSAS CITY.
Passive yaw damping of a teetered rotor versus delta-3 angle values
[DE84-009758] N84-30545
Operation and calibration of the Wincharger 450 model SWECS
[DE84-009757] N84-30546
MISSOURI UNIV., ROLLA.
Kinetic processes in high pressure gases. Excited state collisions
[AD-A141927] N84-30016
Electrochemistry Research Needs for Mineral and Primary Materials Processing: Report of Workshop
[PB84-192905] N84-30062
MITRE CORP., BEDFORD, MASS.
Range corrections for airborne radar - A joint STARS study
[AD-A142383] N84-30154
MITRE CORP., MCLEAN, VA.
Guidelines for contingency planning NASA (National Aeronautics and Space Administration) ADP security risk reduction decision studies
[PB84-189836] N84-30737
MIYAZAKI UNIV. (JAPAN).
Remarks on thermal analyses of thin 4He films in superfluid heat pipe N84-30121
MOBIL RESEARCH AND DEVELOPMENT CORP., PAULSBORO, N.J.
Two-stage process for conversion of synthesis gas to high quality transportation fuels
[DE84-009624] N84-30108
MORTON THIOKOL, BRIGHAM CITY, UTAH.
Nitrate ester polyether glycol prepolymers
N84-29947
Development and fabrication of a graphite/epoxy motor case for air launch missile applications N84-29948
Characterization of filament wound Kevlar and glass composites for rocket motor applications N84-29949
High energy binders
[AD-A142347] N84-30105

N

NAGOYA UNIV. (JAPAN).
Numerical analysis of the burst in the turbulent boundary layer, based on the three-dimensional ortex model
N84-30116
Kolmogorov-style argument for the decaying homogeneous MHD turbulence
[IPPJ-677] N84-30963
The influence of the relativistic character of the electron HF motion on the non-linear wave dynamics in plasmas
[IPPJ-676] N84-30964
Finite-element-analysis of fields radiated from ICRF antenna
[IPPJ-675] N84-30965
Formation of spatial Alfven resonance and global modes in an inhomogeneous plasma
[IPPJ-674] N84-30966
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Debris Flows, Landslides, and Floods in the San Francisco Bay Region, January 1982: Overview and summary of a conference
[PB84-194737] N84-30590
Review of NASA's (National Aeronautics and Space Administration) Numerical Aerodynamic Simulation Program
[NASA-CR-173842] N84-30799
NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA (ONTARIO).
Theoretical and measured airflow about the Twin Otter wing
[AD-A141974] N84-29855
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Analysis of airfoil transitional separation bubbles
[NASA-CR-3791] N84-29854
Calculation of the statistical characteristics of surface
[NASA-TM-77462] N84-30222
Geodynamics
[NASA-CP-2325] N84-30475
Geodynamics: Introduction and background
N84-30476
Projection for space geodynamics, 1988-1998
N84-30477
Recommended program activities, 1988-1998
N84-30478
NASA space biology accomplishments, 1983-84
[NASA-TM-86654] N84-30664
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 261)
[NASA-SP-7011(261)] N84-30683
Index to NASA News Releases and Speeches, 1983
[NASA-TM-85509] N84-31047
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
A method for three-dimensional modeling of wind-shear environments for flight simulator applications
[NASA-TM-85969] N84-29857
Flight characteristics of a manned, low-speed, controlled deep stall vehicle
[NASA-TM-86041] N84-29863
Effect of control logic modifications on airstart performance of F100 engine model derivative engines in an F-15 airplane
[NASA-TM-85900] N84-29879
Flight investigation of various control inputs intended for parameter estimation
[NASA-TM-85901] N84-29884
Simulator evaluation of a remotely piloted vehicle lateral landing task using a visual display
[NASA-TM-85903] N84-29885
Elliptic grid generation for three-dimensional geometries N84-30117
Viscous computation of a space shuttle flow field
[NASA-TM-85977] N84-30225
He-3 cooling systems for space
[NASA-TM-85985] N84-30226
Assessment of Thematic Mapper band-to-band registration by the block correlation method N84-30398
Impact of LANDSAT MSS sensor differences on change detection analysis N84-30408
The effect of spatial, spectral and radiometric factors on classification accuracy using thematic mapper data
[NASA-TM-85995] N84-30510
The influence of a wind tunnel on helicopter rotational noise: Formulation of analysis
[NASA-TM-85982] N84-30687
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 1
[E84-10166] N84-30359
The LANDSAT-4 program: An overview N84-30360
Multispectral Scanner (MSS) instrument description
N84-30362
An overview of LANDSAT-4 and the Thematic Mapper
N84-30364
Radiometric calibration and processing procedure for reflective bands on LANDSAT-4 protoflight Thematic Mapper N84-30366
Thematic Mapper image production in the engineering checkout phase N84-30369
TM digital image products for applications
N84-30371
Spectral characterization of the LANDSAT Thematic Mapper sensors N84-30372
Pre-launch absolute radiometric calibration of LANDSAT-4 protoflight Thematic Mapper N84-30373
Relative radiometric calibration of LANDSAT TM reflective bands N84-30374
Thermal band characterization of LANDSAT-4 Thematic Mapper N84-30376
LANDSAT-4 Science Investigations Summary, including December 1983 Workshop results, volume 2
[E84-10167] N84-30380
Radiometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) data N84-30401
Spectral characterization of the LANDSAT-4 MSS sensors N84-30402
Geometric accuracy assessment of LANDSAT-4 Multispectral Scanner (MSS) N84-30407
Impact of Thematic Mapper sensor characteristics on classification accuracy N84-30410
Assessment of computer-based geologic mapping of rock units in the LANDSAT-4 scene of northern Death Valley, California N84-30416
Quick look analysis of TM data of the Washington, District of Columbia area N84-30418
Preliminary comparisons of the information content and utility of TM versus MSS data N84-30423
LANDSAT-4 Thematic Mapper scene characteristics for a suburban and regional test site N84-30429
Final comparison of TM and MSS data for surface mine assessment in Logan County, West Virginia N84-30430
Comparison of land cover information from LANDSAT Multispectral Scanner (MSS) and airborne Thematic Mapper Simulator (TMS) data for hydrologic applications
N84-30431
Relative accuracy assessment of LANDSAT-4 MSS and TM data for level 1 land cover inventory N84-30432
Earth Observing System. Volume 1, part 2: Science and mission requirements. Working group report appendix
[NASA-TM-86129] N84-30433
Global hydrologic cycle N84-30434
Global biogeochemistry: An overview N84-30435
Biogeochemical considerations N84-30436
Biological oceanography N84-30437
Inland aquatic resources and biogeochemical cycles
N84-30438
Forest environments N84-30439
Land biology N84-30440
Tropospheric chemistry N84-30441
Geology N84-30442
Interior of the Earth N84-30443
Oceanic transport N84-30444
Polar glaciology N84-30445
Sea ice N84-30446
Tropospheric science N84-30447
Middle atmospheric science N84-30448
Aeronomy N84-30449
Earth Observing System. Science and mission requirements, volume 1, part 1
[NASA-TM-86129-VOL-1-PT-1] N84-30450
Earth Observing System, introduction N84-30451
Observational requirements and measurement systems concepts N84-30452
Implementation strategy N84-30453
Earth Observing System, conclusions and recommendations N84-30454
Research activities of the Geodynamics Branch
[NASA-TM-86123] N84-30455
Update: San Andreas Fault experiment N84-30456
Crustal deformation and earthquakes N84-30457
Results of laser ranging collocations during 1983
N84-30458
A comparison between Lageos laser ranging and VLBI determined baselines N84-30459
Geodynamics of crustal deformation and seismotectonic block movements in central Europe N84-30460
Sensitivity of SLR baselines to errors in Earth orientation N84-30461
Analysis of the Earth's variable rotation N84-30462
SEASAT observations of lithospheric flexure
N84-30463
Lageos orbit and the albedo problem N84-30464
Lageos orbit and solar eclipses N84-30465
Verification of the accuracy of GEM-L2 in response to criticism by Lambeck and Coleman N84-30466
Geodyn systems development N84-30467
The ERODYN and QRPIG computer programs
N84-30468
Ocean circulation studies N84-30469
Global mean sea surface based upon SEASAT altimeter data N84-30470
An objective analysis technique for extrapolating tidal fields N84-30471
SEASAT altimetry for surface height of inland seas
N84-30472
Accuracy of mapping the Earth's gravity field fine structure with a spaceborne gravity gradiometer mission
N84-30473
Soil moisture from temperature measurements at the Earth's surface, update N84-30474

Some contributions to knowledge of the magnetospheric plasma by ISEE investigators
[NASA-TM-86124] N84-30962

Submillimeter wavelength survey of the galactic plane from l = -5 deg to l = +62 deg: Structure and energetics of the inner disk
[NASA-TM-86077] N84-31069

Fundamental and harmonic emission in interplanetary type 2 radio bursts
[NASA-TM-86099] N84-31079

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.

Space Shuttle Orbiter improved auxiliary power unit
N84-29965

Preliminary evaluation of Thematic Mapper image data quality N84-30415

Thematic Mapper data quality and performance assessment in renewable resources/agriculture remote sensing N84-30422

Preliminary evaluation of TM for soils information
N84-30427

Increase in whole-body peripheral vascular resistance during three hours of air or oxygen prebreathing
[NASA-TM-58261] N84-30684

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.

Some aerodynamic discoveries and related NACA/NASA research programs following World War 2
[NASA-TM-86258] N84-29847

Acceleration to a steady state for the Euler equations
[NASA-CR-172398] N84-29852

Field repair of AH-16 helicopter window cutting assemblies
[NASA-TM-85831] N84-29864

User's manual for a fuel-conservative descent planning algorithm implemented on a small programmable calculator
[NASA-TM-86275] N84-29871

Design of a candidate flutter suppression control law for DAST ARW-2
[NASA-TM-86257] N84-29883

Heat transfer and oil flow studies on a single-stage-to-orbit control-configured winged entry vehicle
[NASA-TM-85833] N84-29897

Approximation techniques for parameter estimation and feedback control for distributed models of large flexible structures
[NASA-CR-172411] N84-29903

Propulsion options for orbit-on-demand N84-29915

Rapid adhesive bonding concepts
[NASA-TM-86256] N84-29968

ACEE Composite Structures Technology: Review of selected NASA research on composite materials and structures
[NASA-CP-2321] N84-29969

Residual-strength tests of L-1011 vertical fin components after 10 and 20 years of simulated flight service N84-29970

Worldwide flight and ground-based exposure of composite materials N84-29971

Comparison of toughened composite laminates using NASA standard damage tolerance tests N84-29972

Synthesis and toughness properties of resins and composites N84-29973

Tensile strength of composite sheets with unidirectional stringers and crack-like damage N84-29974

Impact dynamics research on composite transport structures N84-29975

Postbuckling behavior of graphite-epoxy panels
N84-29976

Studies of noise transmission in advanced composite material structures N84-29977

Grain-refining heat treatments to improve cryogenic toughness of high-strength steels
[NASA-TM-85816] N84-30014

Methods for analysis of cracks in three-dimensional solids
[NASA-TM-86266] N84-30330

Fatigue and Fracture Branch: A compendium of recently completed and on-going research projects
[NASA-TM-85825] N84-30331

Stratospheric NO and NO2 profiles at sunset from analysis of high-resolution balloon-borne infrared solar absorption spectra obtained at 33 deg N and calculations with a time-dependent photochemical model
[NASA-TM-86265] N84-30566

Global Biology Research Program: Biogeochemical Processes in Wetlands
[NASA-CP-2316] N84-30665

Executive summary: Background N84-30666

Geographic distribution of wetland parameters: The foundation of a data base N84-30667

A framework for wetlands research: Development of a wetlands data base N84-30668

Augmenting computer networks
[NASA-CR-172399] N84-30800

Spectral methods for compressible flow problems
[NASA-CR-172395] N84-30816

Singular value decomposition with systolic arrays
[NASA-CR-172396] N84-30817

Legendre-tau approximation for functional differential equations. Part 2: The linear quadratic optimal control problem
[NASA-CR-172397] N84-30818

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Comparison of icing cloud instruments for 1982-1983 icing season flight program
[NASA-TM-83569] N84-29670

Energy efficient engine program contributions to aircraft fuel conservation
[NASA-TM-83741] N84-29676

Fuel savings potential of the NASA Advanced Turboprop Program
[NASA-TM-83736] N84-29678

Factors that influence space station propulsion requirements N84-29931

Propulsion issues for advanced orbit transfer vehicles
N84-29937

Effects of water-vapor on friction and deformation of polymeric magnetic media in contact with a ceramic oxide
[NASA-TM-83727] N84-30072

Spectrum/orbit utilization program for geostationary satellites
[NASA-TM-83759] N84-30146

MMIC technology for advanced space communications systems
[NASA-TM-83749] N84-30147

Atomization of liquid sheets in high pressure airflow
[NASA-TM-83731] N84-30223

Acoustic pressures emanating from a turbomachine stage
[NASA-TM-83734] N84-30224

Orbital stability in combined uniform axial and three-dimensional wiggler magnetic fields for free-electron lasers
[NASA-TM-83753] N84-30273

Transmission efficiency measurements and correlations with physical characteristics of the lubricant
[NASA-TM-83740] N84-30293

Summary of drive-train component technology in helicopters
[NASA-TM-83726] N84-30294

Improved methods of vibration analysis of pretwisted, airfoil blades
[NASA-TM-83735] N84-30329

Development of a lightweight nickel electrode
[NASA-TM-83739] N84-30528

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

High pressure LOX/natural gas staged combustion technology N84-29927

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. NATIONAL SPACE TECHNOLOGY LABS., BAY SAINT LOUIS, MISS.

LANDSAT scene-to-scene registration accuracy assessment N84-30405

An initial analysis of LANDSAT-4 Thematic Mapper data for the discrimination of agricultural, forested wetland, and urban land covers N84-30414

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WHITE SANDS TEST FACILITY, N. MEX.

Iron nitrate and MON-3 nitrogen tetroxide N84-29909

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

Improved pilot model for application to a computer flight testing program for helicopters
[NLR-MP-83052-U] N84-29889

Review and comparison of discrete and continuous gust methods for the determination of airplane design loads
[NLR-TR-82134-U] N84-29886

Half-model testing in the NLR high speed wind tunnel (HST)
[NLR-TR-82123-U] N84-29891

Description and validation of the two dimensional test setup for multiple airfoils in the pressurized wind tunnel HST
[NLR-TR-83031-U] N84-29892

The effects of strain rate and temperature on the fracture behavior of three structural adhesives
[AD-B084418] N84-30097

Prediction and analysis of variable reluctance stepmotor drive systems
[NLR-TR-81139-U] N84-30216

Grid-size reduction in flow calculations on infinite domains by higher-order far-field asymptotics in numerical boundary conditions
[NLR-MP-83029-U] N84-30253

Some computational aspects of the stability analysis of nonlinear structures
[NLR-MP-82034-U] N84-30351

Three image compression algorithms for Compression and Decompression of Imaging Sensor Signals (CADISS)
[NLR-MP-83027-U] N84-30791

Instrumentation for in-flight acoustic measurements in an engine intake
[NLR-MP-83060-U] N84-30898

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

Residual stress measurements using shear-horizontal waves from electromagnetic acoustic transducers
[PB84-190636] N84-30171

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Decision analysis model for passenger-aircraft fire safety with application to fire-blocking of seats
[AD-A142477] N84-29859

Fire induced flows through room openings - flow coefficients
[PB84-176759] N84-30011

Characterization of organometallic polymers by chromatographic methods and nuclear magnetic resonance, part 2
[PB84-183599] N84-30100

Directional extreme wind speed data for the design of buildings and other structures
[PB84-178847] N84-30139

Computer science and technology: Report on approaches to database translation
[NBS-SP-500-115] N84-30739

Computer science and technology: Introduction to software packages
[NBS-SP-500-114] N84-30740

Measurement techniques for high-power semiconductor materials and devices
[DE84-010425] N84-31016

NATIONAL CENTER FOR APPROPRIATE TECHNOLOGY, BUTTE, MONT.

Technical assistance and information dissemination for the appropriate technology small grants program
[DE84-010957] N84-31042

Appropriate technology management information system
[DE84-010952] N84-31056

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.

Atmospheric chemistry of H2O2, NO3, HONO, and HNO3: Influence of aqueous phase and heterogeneous processes
[PB84-183680] N84-30592

Monthly mean determination of the solar semidiurnal surface pressure oscillation at Batavia from 1866 through 1944
[PB84-184795] N84-30593

National Center for Atmospheric Research
[PB84-183561] N84-30621

White light solar corona: An atlas of 1983 K-coronameter synoptic charts
[PB84-184159] N84-31075

NATIONAL CENTER FOR DEVICES AND RADIOLOGICAL HEALTH, ROCKVILLE, MD.

Instrumentation for nonionizing radiation measurement
[PB84-180603] N84-30271

NATIONAL GEOPHYSICAL DATA CENTER, BOULDER, COLO.

Solar-geophysical data number 473. Part 1: (Prompt reports) data for December 1983, November 1983 and late data
[PB84-180611] N84-31073

Solar-geophysical data number 473. Part 2: (Comprehensive reports) data for July 1983, March 1981 and miscellanea
[PB84-180629] N84-31074

Solar-geophysical data prompt reports, February 1984, number 474. Part 1: Data for January 1984, December 1983 and late data. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188689] N84-31076

Solar-geophysical data comprehensive reports, February 1984, number 474. Part 2: Data for August 1983, April 1981 and miscellanea. Explanation of data reports issued as number 474 (supplement) February 1984
[PB84-188671] N84-31077

Solar-geophysical data explanation of reports, February 1984, number 474, supplement
[PB84-188697] N84-31078

NATIONAL HURRICANE CENTER, CORAL GABLES, FLA.
National Weather Service hurricane probability program
[PB84-182757] N84-30619

NATIONAL INST. VOOR KERNFYSICA EN HOGE ENERGIEYSICA, AMSTERDAM (NETHERLANDS).
Activities in nuclear and high energy physics
[B8467321] N84-30949

NATIONAL MARITIME INST., TEDDINGTON (ENGLAND).
Wave force investigations at the second Christchurch Bay Tower
[NMI-R177] N84-30626

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Program for Regional Observing and Forecasting Services (PROFS)
[PB84-179928] N84-30618
Analysis of some cloud and frontal events recorded during the Boulder Upslope Cloud Observation Experiment (BUCOE) of 1982
[PB84-179662] N84-30622
Variability of the convection field pattern in South Florida and its relationship to the synoptic flow
[PB84-177393] N84-30623
Preliminary report of HF radar measurements of surface currents east of the Strait of Gibraltar near Marbella, Spain, 7-22 October 1982, part 2
[PB84-183664] N84-30637
The NOAA-ERL-ARL solar UV radiation and climate research project program description
[PB84-183292] N84-31070

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
Selection of a general purpose language and a real-time language suitable for shipboard data system 3
[PB84-180892] N84-30795

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
Proceedings of Tsunami Symposium
[PB84-183482] N84-30638

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
LANDSAT-4 Thematic Mapper calibration and atmospheric correction N84-30384
The advantages of sounding with the smaller detectors of the VISSR atmospheric sounder
[NOAA-TM-NESDIS-6] N84-30571

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).
Elastic buffers for digital rings
[NPL-DITC-38/84] N84-30143
Eyebolts for lift suspension
[NPL-DMA(A)70] N84-30292

NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.
Reactive resonance and angular distributions in the rotating linear model
[DE84-011354] N84-30919
Federal funds for research and development, fiscal years 1981, 1982 and 1983, volume 31
[PB84-189596] N84-31045
Federal funds for research and development, fiscal years 1982, 1983 and 1984. Volume 32: Detailed statistical tables
[PB84-189604] N84-31046
National Science Foundation, volume 1
[PB84-193234] N84-31061

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Locally optimum and suboptimum detector performance in a non-Gaussian interference environment
[PB84-184738] N84-30173

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, WASHINGTON, D.C.
Policy implications of information technology
[PB84-183219] N84-31060

NATIONAL WEATHER SERVICE, GARDEN CITY, N.Y.
Zones
[PB84-174325] N84-30616
Automated analysis of upper air soundings to specify precipitation type
[PB84-174333] N84-30617
Verification of asynchronous transmissions
[PB84-189885] N84-30738

NATIONAL WEATHER SERVICE, KANSAS CITY, MO.
Climatological Summary Programs F6 and CLIMAT
[PB84-185941] N84-30603

NATURAL ENVIRONMENT RESEARCH COUNCIL, SWINDON (ENGLAND).
The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30428

NAVAL AIR SYSTEMS COMMAND, WASHINGTON, D. C.
US Navy hindcast spectral ocean wave model climatic atlas: North Atlantic Ocean
[AD-A141810] N84-30627

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Application of sensitivity analysis to aerodynamic parameters of a bank to turn missile
[AD-A141940] N84-29899
Effects of emotional and perceptual-motor stress on a voice recognition system's accuracy: An applied investigation
[AD-A142554] N84-30160
Surface disturbances due to trailing vortices
[AD-A142693] N84-30233
Characterization of submerged-arc and gas-metal-arc weldments in hY-100 steel
[AD-A141939] N84-30298
A synoptic case study analysis of the ocean temperature anomalies in the central Pacific region, 1976 - 1979
[AD-A142546] N84-30631
Interannual variability in sea-surface temperature at one location along the central California coast
[AD-A142553] N84-30632
Computer graphics enhancement for COMEL (communications electronics)
[AD-A141920] N84-30741
Improvements to software maintenance methods in real time embedded aviation flight systems
[AD-A141949] N84-30742
CHART and SKETCH: An interactive computer graphics program
[AD-A141997] N84-30744
A retrievable recipe for inverse t
[AD-A142557] N84-30829
Computer simulation studies of sputtering and multimer formation from clean and oxygen reacted surfaces of titanium, vanadium and niobium
[AD-A141998] N84-31009
The application of a general purpose data base management system to design automation
[AD-A141999] N84-31048

NAVAL RESEARCH LAB., WASHINGTON, D. C.
A high-resolution target-tracking concept using spectral estimation techniques
[AD-A141921] N84-30149
A computer model for a multiple high PRF pulse Doppler radar
[AD-A142357] N84-30152
List metric detection of coded FH/MFSK (Frequency-Hopped Multiple Frequency Shift Keying) in a tone jamming environment
[AD-A142358] N84-30153
Numerical simulations of the structure and propagation of self-sustained detonations
[AD-A142486] N84-30230
Measurements of high resolution spectra on the Omega laser at Rochester University
[DE84-012419] N84-30290
The breaking of ocean surface waves
[AD-A142356] N84-30629
Proton-induced single event upsets in the SBP9989 microprocessor
[AD-A142448] N84-30724
Proton-induced single event upsets in 71 Earth-satellite environments
[AD-A142435] N84-30771
Modifications to iterative recursion unfolding algorithms and computer codes to find more appropriate neutron spectra
[AD-A142475] N84-30775
Measurements of spatially resolved high resolution spectra of laser-produced plasmas
[DE84-012418] N84-30995

NAVAL SEA SYSTEMS COMMAND, WASHINGTON, D.C.
Improving system affordability
[AD-A142387] N84-31062

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.
Characterization of organometallic polymers by chromatographic methods and nuclear magnetic resonance, part 2
[PB84-183599] N84-30100

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
Surface layer effects on the mechanical behavior of metals
[AD-A142280] N84-30018
J-integral tearing instability analysis for 8-inch diameter ASTM A106 steel pipe
[AD-A142589] N84-30023
An integral prediction method for three-dimensional flow separation
[AD-A142551] N84-30231

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.
Analysis of particulates in the exhaust plume of a TF30 engine at military power
[AD-A142510] N84-29882
Interfacial interaction and adhesion in composite materials N84-29961

NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF.
Biomagnetism: Possible new predictor of personnel performance
[AD-A142451] N84-30697

NDT TECHNOLOGIES, INC., SOUTH WINDSOR, CONN.
Electromagnetic inspection of wire ropes using sensor arrays
[AD-A142012] N84-30321

NEBRASKA UNIV., LINCOLN.
Inventory of geothermal resources in Nebraska
[DE84-009679] N84-30518

NEW MEXICO UNIV., ALBUQUERQUE.
Photoionization investigation of iodine molecules and clusters in a supersonic molecular beam
[AD-A142645] N84-30901

NEW YORK UNIV., NEW YORK.
Magnetohydrodynamic equilibrium and stability of stellarators
[DE84-010731] N84-30994

NORTH CAROLINA STATE UNIV., RALEIGH.
Continental shelf processes affecting the oceanography of the South Atlantic Bight
[DE84-010113] N84-30635
Study of nonlinear singular systems
[AD-A142348] N84-30620

NORTHERN RESEARCH AND ENGINEERING CORP., WOBURN, MASS.
Engineering research on positive displacement gas expanders, phase 1
[DE84-008977] N84-30310

NORTHWESTERN UNIV., EVANSTON, ILL.
Organic azides as jet fuel additives: Synthesis of azides and micro-explosion characteristics of droplets
N84-29963

O

OAK RIDGE GASEOUS DIFFUSION PLANT, TENN.
Aspects of electroless nickel plating on molybdenum
[DE84-006434] N84-30057

OAK RIDGE NATIONAL LAB., TENN.
Engineering scoping study of the production of hydrogen and oxygen from the cerium oxide-sodium phosphate/carbonate thermochemical cycle
[DE84-010629] N84-29998
Resonance ionization spectroscopy of argon, krypton and xenon using vacuum ultraviolet light
[DE84-011655] N84-30006
Sulfur and antimony segregation to creep cavity surfaces in Ni and an FCC Fe-Ni-Cr alloy
[DE84-011458] N84-30028
High-temperature alloys: Theory and design
[DE84-010428] N84-30029
Ion implantation, ion beam mixing and annealing studies of metals in Al2O3, SiC and Si3N4
[DE84-012336] N84-30052
Nuclear electromagnetic pulse (EMP) and electric power systems
[DE84-010665] N84-30166
Negative ion formation in SF6 spark by-products
[DE84-012340] N84-30212
Advanced teleoperation in nuclear applications: Consolidated fuel reprocessing program
[DE84-011631] N84-30303
Advancement of remote systems technology: Past perspectives and future plans
[DE84-011460] N84-30309
Automated planning for intelligent machines in energy-related applications
[DE84-011666] N84-30815
Invention of a tunable damper for use with an acoustic waveguide in hostile environments
[DE84-013109] N84-30897
Introduction to neutron scattering by magnetic excitations
[DE84-008579] N84-30904
Role of trench caps in the shallow land burial of low level wastes
[DE84-011824] N84-30944
Information Center Complex publications and presentations, 1971-1982
[DE84-010603] N84-31055

OAKLAND UNIV., ROCHESTER, MICH.
The transfer of atoms, ions and molecular groups in solution. Part 1: Models and limits
[AD-A142333] N84-29981

The transfer of atoms, ions and molecular groups in solution. Part 2: Tunnelling between harmonic wells
[AD-A142334] N84-29982

The transfer of atoms, ions and molecular groups in solution. Part 3: Monte Carlo methods for the evaluation of rate constants
[AD-A142335] N84-29983

A Taylor series in symmetry-adaptable functions
[AD-A142336] N84-30819

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).

La Recherche Aerospatiale, Bimonthly Bulletin, no. 1984-1, 218/ January - February
[ESA-TT-858] N84-29850

Residual curing stress of carbon-resin composites
[ONERA-RT-6/3521-M] N84-29960

OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).

Europe approaches chaos with electrical circuits
[AD-A142065] N84-30179

OFFICE OF SOFTWARE DEVELOPMENT, FALLS CHURCH, VA.

Modular Computer System, Inc. Modular NASA extended FORTRAN 78 C.1
[PB84-180231] N84-30734

Burroughs Corporation, B5900, large systems COBOL74 3.4.1.
[PB84-181379] N84-30735

Burroughs Corporation B1000 system interactive, BASIC release 11.0
[PB84-180215] N84-30794

Data General Corporation ECLIPSE MV/8000, MP-BASIC revision 3.00
[PB84-181361] N84-30796

United Information Services, Inc. CDC Cyber 175, super BASIC version 1.0
[PB84-181387] N84-30797

OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D.C.

Salyut: Soviet steps toward permanent human presence in space
[PB84-181437] N84-29905

Remote sensing and the private sector: Issues for discussion
[PB84-160777] N84-30520

Wetlands: Their use and regulation
[PB84-175916] N84-30561

OHIO STATE UNIV., COLUMBUS.

The influence of nitrogen on the sensitization, corrosion, mechanical and microstructural properties of stainless steels
[DE83-017203] N84-30050

Computational method for thermoviscoelasticity with application to rock mechanics
[DE84-003087] N84-30585

OHIO UNIV., ATHENS.

Microprocessor automation for the Dynaflect Deflection Measuring System
[PB84-180413] N84-30135

OLD DOMINION UNIV., NORFOLK, VA.

Implementation of uniform perturbation method for potential flow past axisymmetric and two-dimensional bodies
[NASA-CR-173829] N84-29851

Theoretcial studies of solar-pumped lasers
[NASA-CR-173833] N84-30274

Feasibility studies of Conversion Electron Moessbauer Spectroscopy (CEMS) of iron-doped InP
[AD-A142463] N84-31014

OLIN CORP., MARION, ILL.

Combustion of GAP, part 1 N84-29952

Development of GAP-TAGN-PEG propellants. Part 1: Study of ingredients N84-29954

Synthesis of diazidodiesters N84-29956

OLSON (RICHARD E.), COLBY, KANS.

On-site analysis to assess the feasibility of wind power
[DE84-009762] N84-30606

OREGON STATE UNIV., CORVALLIS.

Hierarchial command, control and coupled bilinear systems
[AD-A142401] N84-30823

State estimation and control of conditionally linear systems
[AD-A142455] N84-30826

OSAKA UNIV. (JAPAN).

A blowup phenomenon of the working fluid in a two-phase closed thermosyphon N84-30122

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.

Survey and analysis of materials research and development at selected federal laboratories
[DE84-006904] N84-29967

Solving corrosion problems with surface analysis
[DE84-006652] N84-30025

Sputter-deposited metallic and ceramic coatings for heat engines
[DE84-011401] N84-30030

Environmental assisted fracture of cast and wrought steels in brine
[DE84-011870] N84-30058

INFIL1D: A quasi-analytical model for simulating one-dimensional, constant flux infiltration
[DE84-008905] N84-30250

Qualifications of ultrasonic testing for nuclear inservice inspection applications
[DE84-011899] N84-30323

Overview of wind turbine siting considerations
[DE84-011686] N84-30547

Identification and preliminary characterization of global water resource issues which may be affected by CO2-induced climate change
[DE84-011127] N84-30604

Worldwide energy resource distribution estimates
[DE84-012216] N84-30612

US average wind power by season
[DE84-012214] N84-30613

A user-oriented laboratory data entry computer system designed to reduce errors
[DE84-011901] N84-30730

Development of a document preparation staff within an office automation environment
[DE84-008649] N84-31041

PATTERN ANALYSIS AND RECOGNITION CORP., NEW HARTFORD, N.Y.

Report on functional design specification for the automated alphanumeric data entry system
[AD-A142518] N84-30725

PENNSYLVANIA STATE UNIV., MIDDLETOWN.

Teach Ada (trademark) as the student's first programming language?
[AD-P003422] N84-30754

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.

A theoretical and experimental study of turbulent nonevaporating sprays
[NASA-CR-174668] N84-29877

Effect of turbulent boundary layer flow on measurement of acoustic pressure and intensity, revised
[AD-A142473] N84-30229

On measuring the acoustic intensity of hydroacoustic sources
[AD-A142484] N84-30893

PHYSICS LAB. RVO-TNO, THE HAGUE (NETHERLANDS).

Gate arrays
[AD-B082958] N84-30214

A system for policy analysis in manpower planning. Part 2: Design of the dialogue component
[AD-B082961] N84-31043

PIERCE (ALLAN D.), MARIETTA, GA.

Analytical modeling of random thermal fluctuations in the NORDA (Naval Ocean Research and Development Activity) high-frequency sound scattering facility
[AD-A142520] N84-30630

PITTSBURGH UNIV., PA.

Promotion effects on the synthesis of higher alcohols
[DE84-009916] N84-30109

On the design of a Pipelined/Systolic finite element system
[AD-A142558] N84-30830

POLYTECHNIC INST. OF NEW YORK, BROOKLYN.

Photoemission studies of mixed valent systems
[DE84-010797] N84-31020

PRINCETON UNIV., N. J.

Inversion of spectral lineshapes to yield collisional rate constants
[AD-A142661] N84-29994

Nonlocal continuum theory for dislocation and fracture
[AD-A142538] N84-30340

PRINS MAURITS LAB. TNO, RIJSWIJK (NETHERLANDS).

The penetration model of Dehn
[PML-1984-5] N84-30316

PUBLIC SERVICE ELECTRIC AND GAS CO., NEWARK, N. J.

Battery Energy Storage Test (BEST) facility
[DE84-012127] N84-30548

PUERTO RICO UNIV., SAN JUAN.

Development of alternative energy science and engineering in the Caribbean
[PB84-181106] N84-30552

PUGH (PAUL F.) AND ASSOCIATED PROFESSIONAL ENGINEERS, OAKLAND, CALIF.

Energy conservative cable system demonstration project
[DE84-008982] N84-30195

PURDUE UNIV., LAFAYETTE, IND.

PURDU-WINCOF: A computer code for establishing the performance of a fan-compressor unit with water ingestion
[NASA-CR-168005] N84-29875

Solvent, ligand, and ionic charge effects on reaction entropies for simple transition-metal redox couples
[AD-A142374] N84-29984

The prediction of electrochemical reactivities from contemporary theory: Some comparisons with experiment
[AD-A142406] N84-29985

Surface-enhanced Raman spectroscopy of electrochemically characterized interfaces. Transition-metal isothiocyanate adsorbates at silver adsorbates
[AD-A142407] N84-29986

Surface-Enhanced Raman Scattering for redox-active adsorbates: Pentaamminoosmium (3)/(2) and Pentaammineruthenium (2) containing nitrogen heterocycle ligands
[AD-A142418] N84-29987

The reliability of standard rate constants for rapid electrochemical reactions
[AD-A142445] N84-29989

Electrochemical activation parameters for surface-attached reactants evaluation of unimolecular frequency factors for representative ligand-bridged reactions
[AD-A142483] N84-29990

LANDSAT-4 MSS and TM spectral class comparison and coherent noise analysis N84-30381

Spatial resolution estimation of LANDSAT-4 TM data N84-30394

R

RADIATION MONITORING DEVICES, INC., WATERTOWN, MASS.

Low cost, sprayed CuInSe2 solar cell research
[DE84-010480] N84-30533

RCA ASTRO-ELECTRONICS DIV., PRINCETON, N. J.

Evolution and flight history of the Defense Meteorological Satellite Program (DMSP) propulsion module N84-29917

RCA GOVERNMENT SYSTEMS DIV., MOORESTOWN, N. J.

Military Computer Family Operating System: An Ada (trademark) application
[AD-P003427] N84-30759

Ada (trademark) as a program design language: Have the major issues been addressed and answered?
[AD-P003430] N84-30782

READING UNIV. (ENGLAND).

The use of Thematic Mapper data for land cover discrimination: Preliminary results from the UK Satmap programme N84-30428

RESEARCH AND DATA SYSTEMS, INC., LANHAM, MD.

An analysis of the high frequency vibrations in early Thematic Mapper scenes N84-30395

RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).

Third World Congress on Emergency and Disaster Medicine
[FOA-C-52005-H4] N84-30692

Common data base experiment: Detection and location capacity
[FOA-C-20538-T1] N84-31058

RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N.C.

Evaluation of sampling methods for gaseous atmospheric samples
[PB84-190735] N84-30012

Sampling report for the study of personal CO (carbon monoxide) exposure
[PB84-181957] N84-30560

RIO GRANDE ASSOCIATES, HOUSTON, TEX.

The temperature sensitivity of doubly rotated quartz resonators
[AD-A142537] N84-30186

ROCHESTER INST. OF TECH., N. Y.

Evaluation of the radiometric integrity of LANDSAT-4 Thematic Mapper band 6 data N84-30375

ROCHESTER UNIV., N. Y.

Characterization of micron-sized, optical coating defects by photothermal deflection microscopy
[DE84-011150] N84-30960

Nonlocal heat transport by non-Maxwellian electrons
[DE84-012391] N84-31000

Observation of scattered light between Omega-2 and 3/2-Omega in short wavelength laser produced plasmas
[DE84-012533] N84-31001

A new model of Raman spectra in laser produced plasma
[DE84-012487] N84-31005

ROCKET RESEARCH CORP., REDMOND, WASH.

Performance verification tests of an uprated augmented catalytic thruster N84-29911

ROCKETDYNE, CANOGA PARK, CALIF.
SSME modifications for on-demand launch vehicles
N84-29914
LOX/CH4 for reusable high performance booster engines N84-29926

ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.
Shuttle orbiter main propulsion system hardware development and certification for flight N84-29907
The space transportation system reaction control system and orbital maneuvering subsystem N84-29908
Space Shuttle Orbiter improved auxiliary power unit
N84-29965

ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Quality engineering and control
[DE84-011603] N84-30001

ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.
Application of electrochemical and mechanical impedance measurements to corrosion induced failures
[AD-A142468] N84-30021

ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
Propagation loss in electrostatically variable SAW delay lines
[AD-A142433] N84-30183
Nulling in array patterns with orthogonal analytic cancellation beams
[AD-A142719] N84-30188
Static frequency-temperature characteristics of doubly rotated quartz
[AD-A142456] N84-31013

ROME UNIV. (ITALY).
Evaluation of the attenuation length of a scintillator by means of a computer simulation of the light collection efficiency in long scintillation counters
[NOTA-INTERNA-820] N84-30169
Supersymmetric nonlinear sigma models constrained on a noncompact manifold
[PREPRINT-356] N84-30643
Staggered fermions and rotation-gauge invariance
[PREPRINT-357] N84-30937
Some negative results for avoiding lattice fermionic doubling
[PREPRINT-358] N84-30938

S

SACLANT ASW RESEARCH CENTER, LA SPEZIA (ITALY).
A directory of European, Middle Eastern, and North African coastal ground control points for mapping satellite images
[AD-A142019] N84-30512
Wind-generated noise in shallow water
[AD-A141981] N84-30690

SANDIA LABS., ALBUQUERQUE, N. MEX.
Experimental facilities to study hydrogen combustion and detonation
[DE84-008998] N84-29997
Thin flame model for reactive flow in porous materials
[DE84-011406] N84-30002
Pulsed-laser atom-probe studies of surface chemical reactions
[DE84-012811] N84-30007
Experimental research facility for creep-rupture testing of tantalum alloy T-111
[DE84-012030] N84-30036
Creep-fatique and temperature synergisms in alloy 800
[DE84-010131] N84-30046
Liquid metal infiltration of an aluminum alloy into a packed column of B4C particles
[DE84-012136] N84-30055
Alkali-free phosphate glasses for high temperature, high electrical resistivity applications
[DE84-011533] N84-30091
Quality control analysis of TA-23 glass seals for lithium ambient temperature batteries
[DE84-011719] N84-30094
Lead zirconate-lead titanate (PZT) ceramics from organic-derived precursors
[DE84-009921] N84-30095
Acoustical communications by means of small explosive charges
[DE84-008903] N84-30161
UV laser triggering of crowbars used in the Sandia lightning simulator
[DE84-009064] N84-30199
Zinc/bromine batteries: A status review
[DE84-008973] N84-30206
Lightning simulator circuit parameters and performance for severe-threat, high-action-integral testing
[DE84-009065] N84-30211
A users manual for the laser welding code WELD2D
[DE84-011167] N84-30306
Method for defining the distribution of triaxial stress states in underground structures
[DE84-010591] N84-30342
Instrumenting and interpreting the time-varying response of structural systems
[DE84-009067] N84-30346
Development of a high-pressure quasi-isentropic plane wave generating capability
[DE84-011619] N84-30348
Photovoltaic concentrators: Present status and future role
[DE84-005520] N84-30532
Comparison of lightning flash rates from the PBE sensor and streak counting from the DMSP satellite
[DE84-006722] N84-30602
Quality Assurance (QA) procedures for computer software in department 1510
[DE84-012131] N84-30778
SLATEC mathematical subprogram library, version 2.0
[DE84-010750] N84-30782
Software quality assurance programs: Key elements of concern in selected commercial approaches
[DE84-009486] N84-30785
Graphics workstation switching unit
[DE84-011626] N84-30788
GRAPH 2: A digitizing and graph plotting program
[DE84-010747] N84-30834
Boolean computation of optimum hitting sets
[DE84-012920] N84-30842
Propagation of acoustic waves in partially saturated porous media
[DE84-010536] N84-30896
Ambient temperature testing of the G-tunnel heated block
[DE84-009927] N84-30945
Energy-resolving carbon resistance probes for plasma edge characterization
[DE84-012235] N84-30997
Strained layer superlattice materials for millimeter wave FET's, phase 1
[DE84-011475] N84-31007
Transient response of GaAs microwave power FET to X-ray pulses
[DE84-010145] N84-31017
Common data input-retrieval system
[DE84-010972] N84-31053
DBMS conversion case study
[DE84-011205] N84-31054

SANTA BARBARA RESEARCH CENTER, GOLETA, CALIF.
Thematic Mapper (TM) instrument description
N84-30363
Thematic Mapper sensor characteristics N84-30365
HgCdTe surface and defect study program
[AD-A142342] N84-31010

SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
Delayed effects of proton irradiation in Macaca mulatta. 3: Glucose intolerance
[AD-A142289] N84-30669
Elementary principles of linear accelerators
[DE84-007911] N84-30913

SCI-TEC, INC., PRINCETON, N.J.
A program to improve solar blind UV (ultraviolet) flash lamps
[AD-A141909] N84-30177

SCIENCE APPLICATIONS, INC., BOULDER, COLO.
RF-induced stability and transport in axisymmetric tandem mirrors
[DE84-010842] N84-30999

SCIENCE APPLICATIONS, INC., LA JOLLA, CALIF.
Ambient temperature testing of the G-tunnel heated block
[DE84-009927] N84-30945

SCIENCE APPLICATIONS, INC., LOS ANGELES, CALIF.
Recent applications of the CONTAM 3 computer model to spacecraft propulsion systems N84-29916

SCIENCE APPLICATIONS, INC., MCLEAN, VA.
Energy release and fluid dynamics in multiphase systems
[AD-A142402] N84-30228
Geophysical plasmas and atmospheric modeling
[AD-A142573] N84-30572

SCIENCE APPLICATIONS, INC., PLEASANTON, CALIF.
Moving finite elements in 2-D. Technical report: Year 3
[DE84-008551] N84-30840

SCIENCE APPLICATIONS, INC., RALEIGH, N.C.
Long-term salinity, temperature and current measurements in upper Chesapeake Bay
[PB84-180280] N84-30636

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.
Analytic techniques for estimating visible image transmission properties of the atmosphere
[AD-A142524] N84-30954

SEMTEC, INC., HUNTSVILLE, ALA.
Transient and diffusion analysis of HgCdTe
[NASA-CR-162049] N84-30015

SHEFFIELD UNIV. (ENGLAND).
Control systems design for linear dynamic systems using simple models: Some case studies. Part 1: The single-input/single-output case
[RR-247-PT-1] N84-30134
The 8th European Specialist Workshop on Active Microwave Semiconductor Devices 4-6 may 1983
[AD-A142252] N84-30180
A simulation technique for checking the circle criterion
[RR-248] N84-30733
Input-output parametric models for nonlinear systems. Part 1: Deterministic nonlinear systems
[RR-251-PT-1] N84-30844
Input-output parametric models for nonlinear systems. Part 2: Stochastic nonlinear systems
[RR-252-PT-2] N84-30845
Linear structures in bilinear systems
[RR-250] N84-30852

SIMPSON WEATHER ASSOCIATES, CHARLOTTESVILLE, VA.
Wind energy assessment for western Maryland
[PB84-184613] N84-30553

SIMULA, INC., TEMPE, ARIZ.
Design and development of an automatically controlled variable-load energy absorber
[AD-A142683] N84-29868

SKF TECHNOLOGY SERVICES, KING OF PRUSSIA, PA.
Mechanical interactions of rough surfaces
[DE84-008589] N84-30311

SOFTECH, INC., WALTHAM, MASS.
The US Army model Ada (trademark) training curriculum
[AD-P003415] N84-30747
Configuration management with the Ada (trademark) language
[AD-P003416] N84-30748
The CECOM summer faculty research program
[AD-P003421] N84-30753
Integrated Computer-Aided Manufacturing (ICAM) architecture, part 3. Volume 5: Composite function model of manufacture product (MFG0)
[AD-A142337] N84-30766
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers exercise guide
[AD-A142429] N84-30767
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers' guide: Volume 1
[AD-A142430] N84-30768
Ada (registered trademark) training curriculum. Ada (registered trademark) for software managers, L201. Teachers guide: Volume 2
[AD-A142431] N84-30769
Ada (Registered trademark) training curriculum. Software engineering for managers. M101: Teachers guide
[AD-A142432] N84-30770
Integrated Computer-Aided Manufacturing (ICAM) architecture. Part 3, volume 4: Composite information model of design product (DES 1)
[AD-A142447] N84-30774

SOUTHAMPTON UNIV. (ENGLAND).
Audiometric configurations and repeatability in noise-induced hearing loss
[ISVR-TR-123] N84-30694

SOUTHERN SCIENCE, DUNEDIN, FLA.
A study of research needs and priorities in radioactive waste management
[DE84-009045] N84-30946

SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Thickener/fluid interaction in lubricating greases
[AD-A142276] N84-30076
High-temperature lubricants for minimum-cooled diesel engines
[AD-A142426] N84-30078

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Spray pyrolysis of cadmium sulfide/copper indium selenide cells
[DE84-004491] N84-30537
High-latitude ionospheric irregularities
[AD-A142648] N84-30573

STANFORD LINEAR ACCELERATOR CENTER, CALIF.
Klystron voltage pulse timing experiment
[DE84-011753] N84-30176
Recommendations for on-site vibration standards
[DE84-011756] N84-30207
Analytic solution for the problem of gridded gap-electron flow interaction
[DE84-008975] N84-30209
Computer simulation of the Lasertron
[DE84-012242] N84-30287

Making electron beams for SLC linac
[DE84-012072] N84-30907

Temperature rise calculations for the beam pipe in the SLC arcs
[DE84-011704] N84-30924

High-gradient, pulsed operation of superconducting niobium cavities
[DE84-012486] N84-31030

STANFORD UNIV., CALIF.

Research in VLSI (Very Large Scale Integration) systems
[AD-A142511] N84-30185

Flow of foam through porous media
[DE84-012410] N84-30246

A theory for cross-coupling in ultrasonic transducer arrays
[DE84-010327] N84-30259

New adaptive processor for coherent signals and interference
[AD-A142638] N84-30776

Asymmetric Weiner-Poisson control
[AD-A142452] N84-30648

Applications of combinatorics to the busy period in several queueing models
[AD-A142492] N84-30650

Elastic domain wall waves in ferroelectric ceramics and single crystals
[AD-A142393] N84-31011

STATE UNIV. OF NEW YORK, ALBANY.

High yield wind energy resources in the mid-Hudson River basin
[PB84-184951] N84-30530

Modification of the surface temperature by an artificial cirrus cloud
[DE84-011367] N84-30611

The gas-heating phase in electrical breakdown
[AD-A141961] N84-30967

STATE UNIV. OF NEW YORK, STONY BROOK.

Multiphoton ionization spectroscopy and photochemistry of transient species
[DE84-010424] N84-30922

STATE UNIV. OF NEW YORK, SYRACUSE.

The effect of point-spread function interaction with radiance from heterogeneous scenes on multitemporal signature analysis N84-30400

STENCEL AERO ENGINEERING CORP., ARDEN, N.C.

The Stencel S4S ejection seat: A study in new pyrotechnic developments N84-29943

STOCKHOLM UNIV. (SWEDEN).

The blue-green spectrum of gaseous Pb2 wave numbers and constants of the FOu+ - XOg+ system
[USIP-84-06] N84-30009

RF sputtering and annealing of amorphous zinc telluride films
[USIP-84-04] N84-30061

Flavor mixing and the six quark model
[USIP-84-08] N84-30940

SUNSTRAND ENERGY SYSTEMS, ROCKFORD, ILL.

Space Shuttle Orbiter improved auxiliary power unit
N84-29965

SUZUKI METAL INDUSTRY CO. LTD. (JAPAN).

The heat pipe exchanger with controllable heat exchanging area N84-30124

Experimental study of the naphtaline heat pipe
N84-30125

SYSTEM DEVELOPMENT CORP., MCLEAN, VA.

Guideline for computer security certification and accreditation. Category: ADP (Automatic Data Processing) operations. Subcategory: Computer security. Federal information processing standards
[FIPS-PUB-102] N84-30736

SYSTEMS AND APPLIED SCIENCES CORP., HYATTSVILLE, MD.

The use of linear feature detection to investigate Thematic Mapper data performance and processing
N84-30393

SYSTEMS AND APPLIED SCIENCES CORP., VIENNA, VA.

Objective analysis and prediction techniques, 1983
[AD-A142441] N84-30599

SYSTEMS RESEARCH LABS., INC., DAYTON, OHIO.

Characterization of the microstructures of various materials
[AD-A141946] N84-30017

T

TALLEY INDUSTRIES OF ARIZONA, INC., MESA.

High performance, low flame temperature nitramine propellant development N84-29946

TECHNICAL RESEARCH CENTRE OF FINLAND, ESPOO.

Friction in low speed lubricated rolling and sliding contacts
[VTT-16] N84-30318

TECHNICOLOR GRAPHIC SERVICES, INC., SIOUX FALLS, S. DAK.

Study of Thematic Mapper and Multispectral Scanner data applications N84-30421

TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).

Man-machine systems group
[WTHD-161] N84-30703

The Man-Machine Systems Group N84-30704

Summaries of doctorate theses N84-30705

Supervisory control: Introduction and theory
N84-30706

Modeling the human operator's supervising behavior
N84-30707

A utility plant simulator for control room experiments
N84-30708

Fault management N84-30709

A model of the shoulder girdle for use in rehabilitation
N84-30710

Information processing for use in the treatment of severely physically handicapped persons N84-30711

Treatment of patients with a lesion of the brachial plexus N84-30712

Evaluation of arm protheses for unilateral amputees
N84-30713

Proprioception N84-30714

Communication aids for the handicapped N84-30715

Human reliability analysis using event trees
[S/T-REPT-VOL-1-NO-3] N84-30718

Two algorithms for the contact problem in elastostatics, 1982
[PB83-147678] N84-30793

TECHNISCHE UNIV., BERLIN (WEST GERMANY).

Research activities. Part 1: Statements
[ISBN-3-7983-0959-0] N84-31082

TECHNISCHE UNIV., MUNICH (WEST GERMANY).

A concept for the processing and display of Thematic Mapper data N84-30417

TELEDYNE RYAN AERONAUTICAL CO., SAN DIEGO, CALIF.

Firebolt derivative/ramjet engine feasibility investigation (core engine program): Program summary N84-29962

TELESOFT, SAN DIEGO, CALIF.

Seeding the Ada (trademark) software components industry
[AD-P003432] N84-30764

TENNESSEE UNIV., KNOXVILLE.

Capillary separations with calorimetric absorbance detection
[DE84-012466] N84-30291

TENNESSEE VALLEY AUTHORITY, CHATTANOOGA.

Battery test results on Gould GC2-EV200
[DE84-900635] N84-30208

TVA and the electric vehicle
[DE84-900907] N84-31065

TEXAS A&M UNIV., COLLEGE STATION.

Macrocycles containing tin. Synthesis and structure of 1,10-Diphenyl-1,10-Distannabicycle (8.8.8)Hexacosane
[AD-A142703] N84-29966

TEXAS UNIV., AUSTIN.

A study of distributed millimeter-wave isolators
[AD-A142729] N84-30189

Geothermal potential along the Balcones/Ouachita trend, central Texas: Ongoing assessment and selected case studies
[DE84-010626] N84-30578

Spinorial relativistic rotator: The transformation from quasi-Newtonian to Minokowski coordinates
[DE84-009081] N84-30639

Nonlinear dynamics of magnetic islands with curvature and pressure
[DE84-010968] N84-30659

Research program in elementary particle theory
[DE84-011502] N84-30933

Interaction of the precessional wave with free-boundary Alfven surface waves in tandem mirrors
[DE84-012527] N84-31003

TEXAS UNIV. AT DALLAS, RICHARDSON.

Drift scintillation meter
[AD-A142523] N84-30968

TEXTRON BELL AEROSPACE CO., BUFFALO, N. Y.

The compatibility of MON-3 and 301 cryoformed stainless steel N84-29924

Study of high performance alloy electroforming
[NASA-CR-173828] N84-30013

TOKYO NATIONAL TECHNICAL COLL. (JAPAN).

An experimental study of helical guide-type rotating heat pipe N84-30123

TOKYO UNIV. (JAPAN).

Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy
[DE84-012111] N84-30053

TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.

Panama Canal Fog Navigation Study: Candidate system definition
[PB84-180793] N84-30624

Panama Canal Fog Navigation Study: System requirements statement
[PB84-179811] N84-30625

TRENTON STATE COLL., N. J.

The representation of part-whole information in memory
[PB84-180140] N84-30701

TRW, INC., REDONDO BEACH, CALIF.

An advanced host-target environment for the military computer family
[AD-P003428] N84-30760

TRW SPACE TECHNOLOGY LABS., REDONDO BEACH, CALIF.

Tracking and Data Relay Satellite launch recovery mission N84-29918

Thrust balance efficiency measurements for a pulsed inductive thruster N84-29930

TUSKEGEE INST., ALA.

Operating system interface for Ada (trademark) instructors
[AD-P003433] N84-30765

U

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, DORCHESTER (ENGLAND).

Non-inertial flow of dilute polymer solutions in a sudden contraction
[BLL-WH-558-(909A.9F)] N84-30221

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY (ENGLAND).

Solving crack problems with analytical techniques and the finite elements method
[BLL-RISLEY-TR-4940-(9091.9F)] N84-30325

Calculation of crack behaviour on exposure to thermal shock
[BLL-RISLEY-TR-4941-(9091.9F)] N84-30326

UNITED STATES STEEL CORP., MONROEVILLE, PA.

Thermomechanical processing and texture development in Ni-Cr-Mo and Mn-Mo-B armor steels
[AD-A142352] N84-30020

UNITED TECHNOLOGIES CORP., SAN JOSE, CALIF.

Nonlinear structural characterization of solid propellants N84-29951

Kevlar-49/epoxy case skirt structural fatigue strength
N84-29955

Stress transducer interpretation analysis and stability data N84-29957

UNITED TECHNOLOGIES OF NEW MEXICO, INC., EAST HARTFORD, CONN.

Optical support Hartmann sensor optical simulation
[AD-A142525] N84-30955

UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.

A study of the dependence of microsegregation on critical solidification parameters in rapidly-quenched structures
[AD-A142293] N84-30019

UNIVERSAL PROPULSION CO., PHOENIX, ARIZ.

History of aircraft escape system propulsion
N84-29941

UNIVERSITY COLL., GALWAY (IRELAND).

Electro-optical transmission and liquid water content of fogs and clouds
[AD-A142294] N84-30597

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.

Wave uplift pressure on horizontal platforms
[PB84-190628] N84-30257

Nonlinear real-time optical signal processing
[AD-A142619] N84-30956

UNIVERSITY OF SOUTHERN CALIFORNIA, MARINA DEL REY.

Graphics language, version 2.2
[AD-A142438] N84-30772

UNIVERSITY OF WESTERN MICHIGAN, KALAMAZOO.

Use of sperm enzymes to detect genotoxic agents
[AD-A142724] N84-30691

UPPSALA UNIV. (SWEDEN).

First observations of 140 MHz plasma line backscatter during healthy experiments at Tromsoe
[UIO-SR-84-02] N84-30588

UTAH UNIV., SALT LAKE CITY.

Bias removal for conventional magnetotelluric data
[DE84-012169] N84-30579

Biological effects of millimeter-wave irradiation: Living bacterial organisms
[AD-A142474] N84-30670

Electrolytic degradation of lithia-stabilized polycrystalline beta-alumina
[DE84-008668] N84-31027

V

VARIGAS RESEARCH, INC., TIMONIUM, MD.
Compressed air systems: A guidebook on energy and cost savings
[DE84-008802] N84-30133

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Seismic response for multicomponent earthquakes
[PB84-193747] N84-30354
Operator performance on flat-panel displays with line and cell failures
[AD-A142340] N84-30716
Applied mathematics of transport theory
[DE84-011498] N84-30838

W

WASHINGTON STATE DEPT. OF NATURAL RESOURCES, OLYMPIA.
Targeting geothermal exploration sites in the Mount St. Helens area using solid mercury surveys
[DE84-012547] N84-30519

WASHINGTON UNIV., SEATTLE.
Study of stimulated Brillouin and Raman scattering
[DE84-011260] N84-30286
Vegetation and climates of the last 45,000 years in the vicinity of the Nevada Test Site, south-central Nevada
[DE84-009032] N84-30610

WEAPONS SYSTEMS RESEARCH LAB., ADELAIDE (AUSTRALIA).
Wind tunnel tests on a tube-launched missile configuration with a deflectable nose control and a novel wrap-around fin stabiliser
[AD-A142082] N84-29900

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Advanced electric heat pump dual-stroke compressor and system development
[DE84-007916] N84-30239

WESTON OBSERVATORY, MASS.
Geokinetic effects on motion sensitive instrumentation, systems and facilities
[AD-A142682] N84-30575

WESTON (ROY F.), INC., WEST CHESTER, PA.
Operation and maintenance of selected ozone and ultraviolet disinfection systems
[PB84-180124] N84-30719

WISCONSIN UNIV., MADISON.
Intermediate-range grid model and user's guide for atmospheric sulfur dioxide and sulfate concentrations and depositions: Wisconsin Power Plant Impact Study
[PB84-189257] N84-30556
Control theory of partial differential equations
[AD-A142636] N84-30812
Experimental observation of the shear Alfven resonance in a Tokamak
[DE84-012993] N84-30998

WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Undersea acoustic research
[AD-A142339] N84-30891

WOODWARD-CLYDE CONSULTANTS, ROCKVILLE, MD.
Geotechnical and geologic design considerations for a shelf mounted OTEC (Ocean Thermal Energy Conversion) facility
[PB84-186147] N84-30554

WOODARD-CLYDE CONSULTANTS, SAN FRANCISCO, CALIF.
Seismicity of the Paradox Basin and the Colorado Plateau interior
[DE84-011620] N84-30516

WORLD METEOROLOGICAL ORGANIZATION, GENEVA (SWITZERLAND).
World meteorological activities report
[WMO-628] N84-30614

WYOMING UNIV., LARAMIE.
Solid surface luminescence analysis
[DE84-011254] N84-31022

X

XEROX PALO ALTO RESEARCH CENTER, CALIF.
Vibrational studies of the structure of disordered solids
[AD-A142297] N84-30338

Y

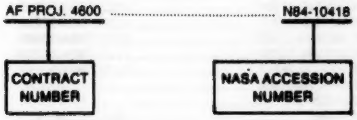
YALE UNIV., NEW HAVEN, CONN.
Techniques for large sparse systems arising from continuation methods
[DE84-010410] N84-30833

YOUNGSTOWN STATE UNIV., OHIO.
Ada (trademark) tasking in numerical analysis
[AD-P003429] N84-30761

CONTRACT NUMBER INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 22 NUMBER 20

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. AFS-D N84-30337
AF PROJ. 1921 N84-30669
AF PROJ. 2304 N84-30150
AF PROJ. 2305 N84-30183
N84-30188
N84-31013
AF PROJ. 2312 N84-30685
AF PROJ. 2402 N84-30967
AF PROJ. 3066 N84-30301
AF PROJ. 6670 N84-30600
N84-30601
AF PROJ. 7757 N84-30669
AF-AFOSR-0009-80 N84-29992
AF-AFOSR-0018-79 N84-30612
AF-AFOSR-0052-81 N84-30620
AF-AFOSR-0053-79 N84-30632
AF-AFOSR-0063-83 N84-29680
N84-30297
AF-AFOSR-0068-83 N84-30647
AF-AFOSR-0082-81 N84-30956
AF-AFOSR-0181-82 N84-30024
AF-AFOSR-0183-83 N84-30901
AF-AFOSR-0228-83 N84-30776
AF-AFOSR-0241-82 N84-30232
AF-AFOSR-0251-81 N84-30297
AF-AFOSR-0300-82 N84-30685
AF-AFOSR-0329-82 N84-30631
N84-30694
ARPA ORDER 3925 N84-30233
A79/KL/130 N84-30316
A79/KL/131 N84-30315
A79/KM/134 N84-30213
A83/KM/001 N84-31043
BMVG-FOA-T/RF31/81006/82302 N84-30144
B99-QAXR N84-30697
DA PROJ. F65-559 N84-29682
DA PROJ. 1L1-61101-AH-45 N84-30294
DA PROJ. 1L1-61102-AH-43 N84-30079
DA PROJ. 1L1-61102-AH-51 N84-30076
DA PROJ. 1L1-62601-AH-91 N84-30020
DA PROJ. 1L7-62733-AH-20 N84-30078
DA PROJ. 1T1-61102-BH-57 N84-30513
N84-30597
DA PROJ. 2Q1-62717-A-779 N84-31037
DA PROJ. 2Q2-63731-A-792 N84-30698
DAAB07-83-C-K514 N84-30767
N84-30768
N84-30769
N84-30770
DAAG29-81-K-0024 N84-30150
DAAG29-81-K-0062 N84-30649
DAAG46-82-C-0054 N84-30020
DAAK70-80-C-0001 N84-30078
DAAK70-81-C-0175 N84-30128
DAAK70-82-C-0001 N84-30076
N84-30078
DAAK80-80-C-0507 N84-30748
DACW39-78-C-0092 N84-30615
DAJA37-81-C-0003 N84-30597
DAJA45-83-C-0037 N84-30555
DAJA45-83-C-0051 N84-30513
DAJA45-83-M-0168 N84-30180
DARPA ORDER 4746 N84-30300
DASG60-80-C-0057 N84-30777
DE-AC01-82CE-15095 N84-31042
N84-31056
DE-AC01-82CE-15151 N84-31038
N84-31039
DE-AC01-82CE-30719 N84-30542
DE-AC01-82ER-30042 N84-30646
DE-AC01-82ER-53126 N84-30978
DE-AC02-76CH-00016 N84-29979
N84-29995
N84-30031
N84-30032
N84-30033
N84-30093
N84-30112
N84-30191
N84-30192
N84-30689
N84-30905
N84-30915
N84-30923
N84-30928
N84-31020
DE-AC02-76CH-03000 N84-30265
N84-30902
DE-AC02-76CH-03073 N84-30066
DE-AC02-76CR-03073 N84-30044
DE-AC02-76ER-01198 N84-30048
DE-AC02-76ER-02009 N84-30903
DE-AC02-76ER-03077 N84-30994
DE-AC02-76ET-29366 N84-30548
DE-AC02-76ET-53051 N84-30996
DE-AC02-76EV-01332 N84-30673
DE-AC02-77CH-00178 N84-30090
N84-31052
DE-AC02-77ER-04451 N84-31027
DE-AC02-78ET-51013 N84-30979
N84-30981
N84-30982
N84-30983
DE-AC02-79ER-10367 N84-30051
DE-AC02-80ER-10556 N84-30350
DE-AC02-80ER-10624 N84-31022
DE-AC02-80ER-10680 N84-30922
DE-AC02-80ER-10691 N84-30611
DE-AC02-81ER-10911 N84-30005
DE-AC02-81ER-10972 N84-30050
DE-AC02-81ER-10996 N84-30633
DE-AC02-81ER-53110 N84-30970
DE-AC02-82CH-10122 N84-30536
N84-30781
DE-AC02-82ER-13026 N84-30533
DE-AC02-82ER-53136 N84-30969
DE-AC02-83CE-40652 N84-30310
DE-AC02-83CH-10093 N84-30064
N84-30534
N84-30535
N84-30536
N84-30537
N84-30543
N84-31026
N84-31057
DE-AC02-83CH-10140 N84-30516
DE-AC02-83ER-40069 N84-31024
DE-AC02-83ER-53162 N84-31002
DE-AC02-84ER-13163 N84-30311
DE-AC03-76ET-53057 N84-30999
DE-AC03-76SF-00098 N84-30004
N84-30027
N84-30063
N84-30067
N84-30110
N84-30201
N84-30202
N84-30210
N84-30266
N84-30586
N84-30609
N84-30783
N84-30784
N84-30658
N84-30912
N84-30918
N84-30929
N84-30930
N84-30942
N84-30958
N84-31029
DE-AC03-76SF-00472 N84-30672
DE-AC03-76SF-00515 N84-30179
N84-30207
N84-30209
N84-30267
N84-30907
N84-30913
N84-30924
N84-31028
N84-31030
DE-AC03-79ET-15450 N84-30111
DE-AC03-81CS-30569 N84-30234
DE-AC03-81CS-40520 N84-30133
DE-AC03-81ER-10858 N84-30640
DE-AC03-81SF-11584 N84-30246
DE-AC04-76DP-00053 N84-29999
N84-30204
DE-AC04-76DP-00613 N84-30302
N84-30305
DE-AC04-76DP-00789 N84-29997
N84-30002
N84-30007
N84-30055
N84-30091
N84-30094
N84-30095
N84-30198
N84-30199
N84-30206
N84-30211
N84-30242
N84-30261
N84-30306
N84-30342
N84-30346
N84-30348
N84-30532
N84-30602
N84-30778
N84-30782
N84-30785
N84-30786
N84-30834
N84-30842
N84-30896
N84-30916
N84-30945
N84-30959
N84-30997
N84-31007
N84-31017
N84-31053
N84-31054
DE-AC04-76DP-03533 N84-30001
DE-AC04-76DR-00789 N84-30036
DE-AC06-84CR-21400 N84-31006
DE-AC06-84OR-21400 N84-29998
N84-30006
N84-30028
N84-30029
N84-30038
N84-30052
N84-30131
N84-30166
N84-30212
N84-30264
N84-30296
N84-30303
N84-30309
N84-30615
N84-30657
N84-30697
N84-30904
N84-30934
N84-31055
DE-AC06-84OR-21400 N84-30944

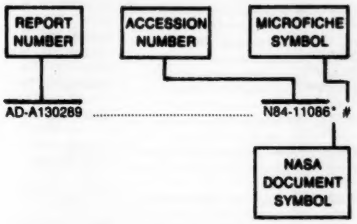
DE-AC06-65RL-01830	N84-29967
	N84-30025
	N84-30557
DE-AC06-76FF-2170	N84-30034
DE-AC06-76FF-02170	N84-30035
	N84-30314
DE-AC06-76RL-01830	N84-30030
	N84-30056
	N84-30065
	N84-30250
	N84-30323
	N84-30547
	N84-30604
	N84-30612
	N84-30613
	N84-30730
	N84-31041
DE-AC06-77RL-01030	N84-30308
DE-AC07-76ID-01570	N84-30092
	N84-30787
DE-AC07-79ET-27014	N84-30519
DE-AC07-79ID-01675	N84-30263
DE-AC07-79ID-12079	N84-30579
DE-AC08-80DP-40124	N84-30960
	N84-31000
	N84-31001
	N84-31005
DE-AC08-82DP-40152	N84-30066
	N84-30269
	N84-30276
	N84-30974
DE-AC09-76SR-00001	N84-30313
DE-AC21-83MC-20212	N84-30531
DE-AC22-80PC-30026	N84-30251
DE-AC22-83PC-60019	N84-30106
DE-AI01-76ET-20356	N84-30000
	N84-31019
DE-AI01-76PR-06010	N84-31016
DE-AI01-77ET-20342	N84-30948
DE-AI06-76ET-44602	N84-30584
	N84-30610
DE-AI06-79DP-40092	N84-30290
	N84-30995
DE-AM03-76SF-00326	N84-30784
DE-AS03-76SF-00034	N84-30003
DE-AS05-76ER-03992	N84-30639
	N84-30933
DE-AS05-76ER-05126	N84-30926
DE-AS05-78ET-52025	N84-30996
DE-AS05-80ER-10711	N84-30636
DE-AS05-83ER-13127	N84-30291
DE-AS07-77ET-28407	N84-30517
DE-AS07-79ET-27205	N84-30518
DE-AS07-79ID-12057	N84-30578
DE-AS08-81DP-40135	N84-31004
DE-AS09-76EV-00902	N84-30635
DE-AS20-82LC-10886	N84-30585
DE-AT03-76ER-10369	N84-30003
DE-AT03-80ER-10708	N84-30059
	N84-30089
DE-AT03-81ER-10865	N84-30259
DE-AT03-84ER-53158	N84-30641
	N84-30976
	N84-30993
DE-FC01-83FE-60149	N84-30106
DE-FG01-81CS-15074	N84-30195
DE-FG02-83ER-40068	N84-30914
DE-FG05-80ET-53088	N84-30659
	N84-31003
DE-FG22-82PC-50796	N84-30241
DE-FG22-82PC-50810	N84-30109
DE-FG47-81R7-01219	N84-30606
DE-FG47-81R7-01221	N84-30545
	N84-30546
DE84-003087	N84-30585
DGR-461/179	N84-30950
DI-BM-J0-134014	N84-30062
DI-14-34-0001-1103	N84-30527
DI-14-34-0001-1466	N84-30526
DI-14-34-0001-2107	N84-30674
DRET-83.34.B3	N84-29980
DTFA01-84-C-0010	N84-29848
DTFA03-81-C-00076	N84-30073
DTFA30-83-A-0034	N84-29859
EG-77-C-01-4042	N84-30605
EPA-R-804442	N84-30525
EPA-R-806878	N84-30556
EPA-R-807637	N84-30524
EPA-68-02-2991	N84-30012
EPA-68-02-3679	N84-30560
EPA-68-03-3019	N84-30719
EPRI PROJ. 255-2	N84-30548
EPRI PROJ. 2198-1	N84-30557
ESTEC-5047/82/NL-HP	N84-30791
F04611-75-C-0042	N84-29957
F04611-79-C-0019	N84-29957
F04611-80-C-0052	N84-29951
F04611-82-C-0029	N84-29929
F04611-82-C-0049	N84-29928
F04611-82-C-0058	N84-29930
F04701-72-C-0221	N84-29917
F04704-83-C-0001	N84-29949
F08635-82-K-0062	N84-30227
F12141	N84-30724
F19628-79-C-0108	N84-30968
F19628-80-C-0146	N84-30159
F19628-80-C-0185	N84-30951
F19628-81-C-0072	N84-29988
F19628-81-C-0128	N84-30186
F19628-81-K-0005	N84-30575
F19628-82-C-0001	N84-30154
F19628-82-C-0023	N84-30599
F19628-82-C-0060	N84-30954
F29601-83-C-0023	N84-30955
F33615-77-C-3123	N84-29865
	N84-29866
F33615-78-C-5005	N84-29881
F33615-80-C-5079	N84-30017
F33615-80-C-5109	N84-30766
	N84-30774
F33615-81-K-1429	N84-30184
	N84-30187
F33615-81-K-5014	N84-30341
F33615-82-C-0501	N84-30692
F33615-82-C-5030	N84-30320
F33615-82-K-0631	N84-30670
F33615-82-K-3016	N84-29856
F33615-83-C-1048	N84-29991
F33615-83-C-3401	N84-29945
F33615-83-K-0504	N84-30691
F33657-72-C-0379	N84-29942
F42600-81-C-4713	N84-29958
F49620-79-C-0058	N84-30776
F49620-82-C-0001	N84-30258
F49620-83-C-0066	N84-30689
F49620-83-K-0025	N84-30573
HDO-TNO-0.0373/K	N84-30168
HSE-1533	N84-30292
LR-154	N84-30960
L82/ALG/107	N84-30167
MDA903-79-C-0018	N84-29860
	N84-29873
	N84-29874
	N84-30322
MDA903-79-C-0330	N84-31037
MDA903-81-C-0335	N84-30772
MDA903-83-C-0108	N84-31010
MDA903-83-C-0202	N84-30756
MDA903-83-C-0335	N84-30185
MDA903-84-K-0062	N84-30185
MIPR-N-84-18	N84-30104
NAGW-124	N84-31068
NAG1-296	N84-30801
NAG1-306	N84-29853
NAG3-190	N84-29877
NAG3-204	N84-29875
NAG3-475	N84-30145
NAG5-137	N84-30595
NASW-3165	N84-30664
NASW-3425	N84-30737
NASW-3511	N84-30799
NASW-3541	N84-30222
NAS1-16087	N84-29901
NAS1-16394	N84-29852
NAS1-16406	N84-29978
NAS1-16585	N84-29854
NAS1-16923	N84-30328
NAS1-17070	N84-29903
	N84-30800
	N84-30816
	N84-30817
	N84-30818
NAS1-17130	N84-29852
	N84-29903
	N84-30800
	N84-30818
NAS1-17231	N84-30886
NAS1-17428	N84-29888
NAS3-23353	N84-29931
NAS7-918	N84-29910
NAS8-32981	N84-30529
NAS8-33698	N84-30015
NAS8-35670	N84-29902
NAS8-35817	N84-30013
NAS9-17200	N84-30684
NB82-NADA-3033	N84-30140
NCC1-65	N84-29851
NGL-22-009-124	N84-30808
NIVR-1722	N84-30097
NIVR-1896	N84-30898
NIVR-1967	N84-30791
NSF ATM-81-07027	N84-30620
NSF CEE-81-05790	N84-30137
NSF CEE-81-07217	N84-30136
	N84-30343
	N84-30358
NSF CEE-81-10050	N84-30357
NSF CEE-82-13851	N84-30356
NSF CEE-82-14070	N84-30354
NSF CEE-82-19356	N84-30590
NSF CEP-81-03635	N84-31021
NSF CHE-82-18785	N84-30930
NSF CPE-83-01523	N84-30062
NSF ECS-82-06495	N84-30808
NSF ECS-82-10960	N84-30808
NSF ECS-82-17631	N84-30822
NSF INT-83-02757	N84-30552
NSF MCS-82-17445	N84-30825
NSF PFR-78-10631	N84-30590
NSF PFR-79-08257	N84-30357
NSF PFR-79-08984	N84-30355
NSG-1450	N84-30888
NSG-1568	N84-30274
NSG-7603	N84-31066
N00014-75-C-0477	N84-30016
N00014-75-C-0643	N84-30810
	N84-30811
	N84-30827
N00014-76-C-0408	N84-29960
N00014-76-C-0475	N84-30848
	N84-30850
N00014-76-C-0806	N84-31012
N00014-77-C-0103	N84-30777
N00014-77-C-0196	N84-30891
N00014-77-C-0293	N84-29981
	N84-29982
	N84-29983
	N84-30819
N00014-77-C-0532	N84-30155
N00014-78-C-0071	N84-30628
N00014-78-C-0238	N84-30716
N00014-78-C-0526	N84-30151
N00014-78-C-0721	N84-29994
N00014-79-C-0222	N84-31011
N00014-79-C-0323	N84-31050
N00014-79-C-0424	N84-30077
	N84-30157
	N84-30158
	N84-30181
	N84-30182
	N84-30723
	N84-30821
	N84-30822
	N84-30824
	N84-30825
	N84-31012
N00014-79-C-0533	N84-30148
N00014-79-C-0553	N84-30189
N00014-79-C-0584	N84-29966
N00014-79-C-0649	N84-30019
N00014-79-C-0670	N84-29984
	N84-29985
	N84-29986
	N84-29987
	N84-29989
	N84-29990
N00014-80-C-0132	N84-30967
N00014-80-C-0455	N84-30830
N00014-80-C-0505	N84-30299
	N84-30686
	N84-30687
	N84-30773
	N84-30809
	N84-30810
	N84-30811
	N84-30827
N00014-80-C-0713	N84-30338
N00014-80-C-0763	N84-30177
N00014-81-C-0692	N84-30633
N00014-81-K-0431	N84-30077
N00014-81-K-0620	N84-29993
N00014-81-K-0814	N84-30823
	N84-30826
N00014-82-C-0663	N84-30514
N00014-82-C-0800	N84-29947
	N84-30105
N00014-82-C-2037	N84-30228
N00014-82-K-0050	N84-30081
N00014-82-K-0063	N84-30339
N00014-82-K-0208	N84-30900
N00014-82-K-0329	N84-31036
N00014-82-K-0334	N84-30687
N00014-82-K-0487	N84-30700
N00014-82-K-0582	N84-30808
N00014-83-C-0088	N84-30598
N00014-83-C-0260	N84-30630
N00014-83-C-0270	N84-30080
N00014-83-C-0377	N84-30802

N00014-83-C-0394 N84-30300
N00014-83-C-0484 N84-30321
N00014-83-C-0749 N84-30725
N00014-83-C-0761 N84-30699
N00014-83-C-2034 N84-30572
N00014-83-G-0056 N84-30671
N00014-83-K-0068 N84-30596
N00014-83-K-0126 N84-30340
N00014-83-K-0193 N84-30717
N00014-83-K-0207 N84-29963
N00014-83-K-0215 N84-31034
N00014-83-K-0228 N84-30074
N84-30075
N00014-83-K-0306 N84-29963
N00014-83-K-2018 N84-31014
N00014-84-K-0073 N84-30953
N00019-83-C-0111 N84-29962
N00024-79-C-6043 N84-30229
N84-30651
N84-30693
N00024-83-C-5301 N84-29906
N84-29939
N62269-82-C-0246 N84-30021
N62269-82-C-0254 N84-29868
PHS MH-36533 N84-30701
PHS-NIOSH-210-81-6001 N84-30695
PROJ. D01-R N84-29921
RB-RLD-1982:1.1.2 N84-29886
RR0-1306 N84-30230
RR0-1405 N84-30629
RR0-2105 N84-30149
RR0-4204 N84-30699
SERC-GR/B/23250 N84-30134
SERC-GR/B/31163 N84-30644
N84-30645
SR02403001 N84-29961
SWEDCBR-810372-7 N84-30699
S15-80 N84-30775
W-31-109-ENG-38 N84-30039
N84-30049
N84-30053
N84-30056
N84-30190
N84-30193
N84-30205
N84-30236
N84-30237
N84-30238
N84-30240
N84-30243
N84-30249
N84-30260
N84-30262
N84-30304
N84-30728
N84-30786
N84-30803
N84-30814
N84-30856
N84-30906
N84-30908
N84-30917
N84-30925
N84-30931
N84-30971
N84-31025
W-31-209-ENG-38 N84-30345
W-7405-ENG-26 N84-30028
N84-30057
N84-30239
N84-30296
N84-30992
W-7405-ENG-36 N84-30040
N84-30062
N84-30163
N84-30165
N84-30194
N84-30200
N84-30203
N84-30235
N84-30245
N84-30248
N84-30268
N84-30277
N84-30278
N84-30279
N84-30280
N84-30281
N84-30284
N84-30285
N84-30289
N84-30295
N84-30307
N84-30349
N84-30539
N84-30576
N84-30580
N84-30582
N84-30583
N84-30607
N84-30780
N84-30604
N84-30613
N84-30636
N84-30637
N84-30653
N84-30654
N84-30655
N84-30660
N84-30695
N84-30911
N84-30919
N84-30920
N84-30927
N84-30943
N84-30947
N84-30972
N84-30973
N84-30975
N84-30980
N84-30984
N84-30985
N84-30986
N84-30987
N84-30989
N84-30990
N84-31072
N84-31060
N84-31061
W-7405-ENG-48 N84-29996
N84-30026
N84-30041
N84-30045
N84-30047
N84-30104
N84-30107
N84-30113
N84-30132
N84-30162
N84-30164
N84-30197
N84-30244
N84-30247
N84-30267
N84-30282
N84-30283
N84-30288
N84-30312
N84-30344
N84-30577
N84-30581
N84-30587
N84-30608
N84-30720
N84-30727
N84-30729
N84-30731
N84-30732
N84-30779
N84-30789
N84-30805
N84-30806
N84-30807
N84-30835
N84-30909
N84-30910
N84-30921
N84-30932
N84-30991
N84-31018
N84-31021
N84-31023
N84-31071
W-7405-ENG-82 N84-30037
N84-30042
N84-30054
N84-30347
W-7405-ENG-92 N84-30941
WR0-2101 N84-30149
ZR0-230 N84-30231
ZR0-0001 N84-30018
147-44-02 N84-30566
199-30-36-02 N84-30665
199-99-00 N84-30684
505-31-01 N84-30225
505-31-42 N84-29677
505-31-53 N84-29888
N84-30014
505-31-83 N84-29852
N84-29903
N84-30600
N84-30616
N84-30617
N84-30618
505-32-2A N84-29875
505-33-23 N84-30330
505-33-33 N84-29866
505-33-33-05 N84-30331
505-33-42 N84-30329
505-33-53 N84-30666
505-34-03-05 N84-29883
505-34-13 N84-30601
505-40-5A N84-30224
505-40-12C N84-29876
505-40-22 N84-30223
505-40-42 N84-30293
505-42-11 N84-30687
505-42-23 N84-29864
505-43-11 N84-29884
505-43-43-01 N84-29847
505-45-1A N84-29870
505-45-11 N84-29857
505-45-33 N84-29871
506-51-13-06 N84-29897
506-53-1B N84-30072
506-53-43-01 N84-30328
506-54-1A N84-30273
506-54-21 N84-30226
506-55-52 N84-30526
506-58-22 N84-30147
533-02-21 N84-29879
533-03-11 N84-29885
534-06-13 N84-29969
535-03-12 N84-29878
643-10-01 N84-30146
677-21-26 N84-30510

REPORT / ACCESSION NUMBER INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 22 NUMBER 20

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-9777	N84-29857*	#
A-9799	N84-30225*	#
A-9815	N84-30887*	#
A-9821	N84-30226*	#
A-9836	N84-30510*	#
ACT-39	N84-30825	#
ACT-40	N84-30824	#
ACT-45	N84-30723	#
AD-A133710	N84-30808*	#
AD-A138400	N84-31051	#
AD-A139952	N84-30063	#
AD-A141059	N84-30685	#
AD-A141136	N84-29896	#
AD-A141810	N84-30627	#
AD-A141904	N84-30297	#
AD-A141905	N84-29880	#
AD-A141906	N84-30275	#
AD-A141909	N84-30177	#
AD-A141914	N84-30148	#
AD-A141915	N84-30628	#
AD-A141920	N84-30741	#
AD-A141921	N84-30149	#
AD-A141923	N84-30074	#
AD-A141925	N84-31033	#
AD-A141927	N84-30016	#
AD-A141939	N84-30298	#
AD-A141940	N84-29899	#
AD-A141941	N84-30128	#
AD-A141943	N84-30227	#
AD-A141946	N84-30017	#
AD-A141949	N84-30742	#
AD-A141955	N84-30335	#
AD-A141960	N84-30951	#
AD-A141961	N84-30967	#
AD-A141965	N84-29872	#
AD-A141966	N84-30336	#
AD-A141974	N84-29855	#
AD-A141978	N84-29881	#
AD-A141981	N84-30890	#
AD-A141982	N84-30721	#
AD-A141983	N84-30952	#
AD-A141991	N84-30743	#
AD-A141997	N84-30744	#
AD-A141998	N84-31009	#
AD-A141999	N84-31048	#
AD-A142001	N84-30320	#
AD-A142004	N84-30178	#
AD-A142010	N84-30602	#
AD-A142012	N84-30321	#
AD-A142013	N84-30555	#
AD-A142014	N84-30596	#
AD-A142017	N84-30075	#
AD-A142019	N84-30512	#
AD-A142025	N84-30513	#
AD-A142071	N84-29873	#
AD-A142072	N84-29860	#
AD-A142073	N84-30322	#
AD-A142075	N84-29874	#
AD-A142079	N84-30104	#
AD-A142082	N84-29900	#
AD-A142085	N84-30179	#
AD-A142252	N84-30180	#
AD-A142276	N84-30076	#
AD-A142280	N84-30018	#
AD-A142281	N84-31034	#
AD-A142289	N84-30889	#
AD-A142290	N84-30337	#
AD-A142293	N84-30019	#
AD-A142294	N84-30597	#
AD-A142295	N84-29848	#
AD-A142296	N84-30514	#
AD-A142297	N84-30338	#
AD-A142333	N84-29961	#
AD-A142334	N84-29962	#
AD-A142335	N84-29963	#
AD-A142336	N84-30619	#
AD-A142337	N84-30766	#
AD-A142339	N84-30891	#
AD-A142340	N84-30716	#
AD-A142341	N84-30900	#
AD-A142342	N84-31010	#
AD-A142345	N84-30150	#
AD-A142346	N84-30847	#
AD-A142347	N84-30105	#
AD-A142348	N84-30620	#
AD-A142350	N84-30339	#
AD-A142352	N84-30020	#
AD-A142353	N84-30151	#
AD-A142356	N84-30629	#
AD-A142357	N84-30152	#
AD-A142358	N84-30153	#
AD-A142363	N84-30154	#
AD-A142364	N84-30621	#
AD-A142374	N84-29964	#
AD-A142376	N84-30155	#
AD-A142377	N84-30181	#
AD-A142381	N84-30182	#
AD-A142382	N84-30077	#
AD-A142387	N84-31062	#
AD-A142388	N84-30511*	#
AD-A142389	N84-31035	#
AD-A142392	N84-31036	#
AD-A142393	N84-31011	#
AD-A142394	N84-30622	#
AD-A142399	N84-29849	#
AD-A142400	N84-29865	#
AD-A142401	N84-30623	#
AD-A142402	N84-30228	#
AD-A142403	N84-30745	#
AD-A142404	N84-30624	#
AD-A142405	N84-31012	#
AD-A142406	N84-29965	#
AD-A142407	N84-29966	#
AD-A142409	N84-30598	#
AD-A142410	N84-30722	#
AD-A142414	N84-30723	#
AD-A142415	N84-30625	#
AD-A142417	N84-30156	#
AD-A142418	N84-29967	#
AD-A142420	N84-30892	#
AD-A142421	N84-30157	#
AD-A142424	N84-29866	#
AD-A142425	N84-29968	#
AD-A142426	N84-30078	#
AD-A142427	N84-30158	#
AD-A142429	N84-30767	#
AD-A142430	N84-30768	#
AD-A142431	N84-30769	#
AD-A142432	N84-30770	#
AD-A142433	N84-30183	#
AD-A142434	N84-30696	#
AD-A142435	N84-30771	#
AD-A142436	N84-30772	#
AD-A142440	N84-30773	#
AD-A142441	N84-30599	#
AD-A142444	N84-29869	#
AD-A142445	N84-29969	#
AD-A142447	N84-30774	#
AD-A142448	N84-30724	#
AD-A142450	N84-31037	#
AD-A142451	N84-30897	#
AD-A142452	N84-30848	#
AD-A142455	N84-30826	#
AD-A142456	N84-31013	#
AD-A142457	N84-30698	#
AD-A142460	N84-30827	#
AD-A142462	N84-30184	#
AD-A142463	N84-31014	#
AD-A142465	N84-30849	#
AD-A142467	N84-29894	
AD-A142468	N84-30021	#
AD-A142473	N84-30229	#
AD-A142474	N84-30670	#
AD-A142475	N84-30775	#
AD-A142477	N84-29859	#
AD-A142478	N84-30159	#
AD-A142482	N84-30609	#
AD-A142483	N84-29990	#
AD-A142484	N84-30893	#
AD-A142486	N84-30230	#
AD-A142488	N84-30610	#
AD-A142489	N84-30611	#
AD-A142490	N84-30671	#
AD-A142492	N84-30850	#
AD-A142493	N84-29861	#
AD-A142504	N84-30022	#
AD-A142505	N84-30828	#
AD-A142506	N84-30079	#
AD-A142508	N84-29867	#
AD-A142510	N84-29882	#
AD-A142511	N84-30185	#
AD-A142513	N84-30953	#
AD-A142515	N84-30299	#
AD-A142518	N84-30725	#
AD-A142520	N84-30630	#
AD-A142523	N84-30968	#
AD-A142524	N84-30954	#
AD-A142525	N84-30955	#
AD-A142527	N84-30129	#
AD-A142532	N84-30686	#
AD-A142536	N84-29991	#
AD-A142537	N84-30186	#
AD-A142538	N84-30340	#
AD-A142541	N84-29992	#
AD-A142542	N84-30080	#
AD-A142544	N84-29993	#
AD-A142548	N84-30631	#
AD-A142549	N84-30687	#
AD-A142550	N84-30688	#
AD-A142551	N84-30231	#
AD-A142553	N84-30632	#
AD-A142554	N84-30160	#
AD-A142555	N84-31015	#
AD-A142557	N84-30829	#
AD-A142558	N84-30830	#
AD-A142573	N84-30572	#
AD-A142589	N84-30023	#
AD-A142590	N84-30515	#
AD-A142599	N84-30187	#
AD-A142600	N84-30689	#
AD-A142601	N84-30232	#
AD-A142605	N84-30300	#
AD-A142606	N84-30081	#
AD-A142609	N84-30024	#
AD-A142619	N84-30956	#
AD-A142620	N84-30633	#
AD-A142634	N84-30694	#
AD-A142636	N84-30612	#
AD-A142637	N84-30831	#
AD-A142638	N84-30776	#
AD-A142644	N84-30832	#
AD-A142645	N84-30901	#
AD-A142648	N84-30573	#
AD-A142650	N84-29856	#
AD-A142661	N84-29994	#
AD-A142662	N84-30699	#
AD-A142670	N84-30690	#
AD-A142671	N84-30957	#
AD-A142673	N84-30574	#
AD-A142675	N84-30341	#
AD-A142676	N84-30600	#
AD-A142677	N84-30717	#
AD-A142679	N84-30634	#
AD-A142682	N84-30575	#
AD-A142683	N84-29868	#

AD-A142693	N84-30233	#
AD-A142696	N84-30301	#
AD-A142698	N84-30726	#
AD-A142700	N84-31049	#
AD-A142703	N84-29986	#
AD-A142706	N84-30601	#
AD-A142707	N84-30777	#
AD-A142712	N84-31050	#
AD-A142719	N84-30188	#
AD-A142720	N84-30651	#
AD-A142724	N84-30691	#
AD-A142727	N84-30130	#
AD-A142729	N84-30189	#
AD-A142732	N84-30700	#
AD-A142733	N84-30258	#
AD-A142852	N84-29908	#
AD-A143025	N84-29939	#
AD-B082958	N84-30214	#
AD-B082961	N84-31043	#
AD-B084418	N84-30097	#
AD-E001718	N84-30572	#
AD-E440240	N84-30828	#
AD-E440241	N84-30022	#
AD-E500640	N84-29873	#
AD-E500641	N84-29860	#
AD-E500642	N84-30322	#
AD-E500654	N84-29874	#
AD-E750170	N84-30338	#
AD-E750170	N84-30514	#
AD-E800881	N84-30627	#
AD-E800940	N84-29899	#
AD-E800940	N84-30128	#
AD-E800940	N84-30227	#
AD-E800940	N84-30296	#
AD-E800952	N84-29867	#
AD-E800955	N84-29862	#
AD-F300434	N84-30079	#
AD-F630334	N84-30188	#
AD-F630334	N84-30651	#
AD-P003414	N84-30746	#
AD-P003415	N84-30747	#
AD-P003416	N84-30748	#
AD-P003417	N84-30749	#
AD-P003418	N84-30750	#
AD-P003419	N84-30751	#
AD-P003420	N84-30752	#
AD-P003421	N84-30753	#
AD-P003422	N84-30754	#
AD-P003423	N84-30755	#
AD-P003424	N84-30756	#
AD-P003425	N84-30757	#
AD-P003426	N84-30758	#
AD-P003427	N84-30759	#
AD-P003428	N84-30760	#
AD-P003429	N84-30761	#
AD-P003430	N84-30762	#
AD-P003431	N84-30763	#
AD-P003432	N84-30764	#
AD-P003433	N84-30765	#
AERO-1292	N84-30231	#
AERONOMICA-ACTA-A-284-1984	N84-30564	
AERONOMICA-ACTA-A-286-1984	N84-30565	
AFAMRL-TR-84-017-VOL-2	N84-30892	#
AFAMRL-TR-84-018	N84-29872	#
AFAMRL-TR-84-020	N84-30691	#
AFATL-TR-83-90	N84-30227	#
AFFDL-TR-79-3118-VOL-7	N84-29865	#
AFGL-ERP-854	N84-30574	#
AFGL-ERP-861	N84-30600	#
AFGL-ERP-869	N84-30601	#
AFGL-TR-83-0236	N84-30954	#
AFGL-TR-83-0240	N84-30574	#
AFGL-TR-83-0306	N84-30600	#
AFGL-TR-83-0333	N84-30589	#
AFGL-TR-84-0029	N84-30601	#
AFGL-TR-84-0031	N84-30575	#
AFGL-TR-84-0076	N84-30186	#
AFGL-TR-84-0103	N84-30966	#
AFIT/CI/NR-84-7T	N84-30952	#
AFIT/CI/NR-84-10D	N84-30722	#
AFIT/GSO/OS/83D-1	N84-29898	#
AFLRL-171	N84-30078	#

AFLRL-173	N84-30076	#
AFOSR-84-0160TR	N84-30232	#
AFOSR-84-0335TR	N84-30150	#
AFOSR-84-0400TR	N84-30685	#
AFOSR-84-0451TR	N84-30820	#
AFOSR-84-0458TR	N84-30647	#
AFOSR-84-0502TR	N84-30894	#
AFOSR-84-0504TR	N84-30832	#
AFOSR-84-0506TR	N84-30612	#
AFOSR-84-0508TR	N84-30631	#
AFOSR-84-0509TR	N84-30024	#
AFOSR-84-0510TR	N84-30573	#
AFOSR-84-0517TR	N84-30776	#
AFOSR-84-0527TR	N84-30689	#
AFOSR-84-0538TR	N84-30956	#
AFOSR-84-0539TR	N84-30258	#
AFOSR-84-0543TR	N84-30901	#
AFOSR-84-0546TR	N84-29992	#
AFRRI-SR83-23	N84-30957	#
AFRRI-SR83-26	N84-30690	#
AFWAL-TR-82-3030	N84-30336	#
AFWAL-TR-82-4063-VOL-4	N84-30774	#
AFWAL-TR-82-4063-VOL-5	N84-30766	#
AFWAL-TR-82-4201	N84-31033	#
AFWAL-TR-83-2091	N84-30301	#
AFWAL-TR-83-3027	N84-29866	#
AFWAL-TR-83-3087	N84-29856	#
AFWAL-TR-83-3124	N84-30967	#
AFWAL-TR-83-4000	N84-31033	#
AFWAL-TR-83-4069-VOL-1	N84-29881	#
AFWAL-TR-84-1033	N84-29991	#
AFWAL-TR-84-1034	N84-30184	#
AFWAL-TR-84-1035	N84-30187	#
AFWAL-TR-84-4022-VOL-1	N84-30320	#
AFWAL-TR-84-4026	N84-30341	#
AFWAL-TR-84-4052	N84-30017	#
AFWL-TR-83-115	N84-30955	#
AGARD-AG-276	N84-29884	
AI-M-750	N84-30809	#
AI-M-756	N84-30810	#
AI-M-757	N84-30811	#
AI-M-758	N84-30827	#
AI-M-762	N84-30687	#
AI-M-780	N84-30686	#
AI-TR-704	N84-30773	#
AI-TR-754-REV	N84-30299	#
AIAA-83-2221	N84-29883*	#
AMA-84-11	N84-29901*	#
AMMRC-TR-84-14	N84-30020	#
ANL-CT/VA-2349	N84-30249	#
ANL-HEP-CP-84-09	N84-30908	#
ANL-HEP-CP-84-20	N84-31028	#
ANL-82-84-REV-1	N84-30728	#
ANL-84-5	N84-30240	#
ANL-84-29	N84-30814	#
ANL/FPP-TM-182	N84-30193	#
ANL/FPP/TM-179	N84-30931	#
ANL/TM-335-REV	N84-30786	#
AR-2	N84-29889	#
AR-2	N84-30050	#
AR-5	N84-31040	#
AR-17	N84-30672	#
AR-32	N84-31061	#
AR-003-012	N84-30333	#
AR-003-906	N84-30332	#
ARBRL-MR-03354	N84-30079	#
ARC-TN-1121	N84-30328*	#
ARI-RN-84-87	N84-30696	#
ARI-RN-84-91	N84-31037	#
ARL-STRUC-REPT-400	N84-30333	#
ARL/PSU/TM-84-28	N84-30851	#
ARL/PSU/TM-84-87-REV	N84-30229	#
ARL/PSU/TM-84-91	N84-30693	#

ARLCB-MR-84013	N84-30022	#
ARLCB-TR-84008	N84-30828	#
ASD-ENSS-84-1	N84-30337	#
ASD-TR-84-5006	N84-30337	#
ASR-2	N84-30455*	#
ASR-4	N84-29994	#
ASRC-PUB-970	N84-30967	#
B-197119	N84-29858	#
B-202205	N84-31044	#
B-210587	N84-30570	#
B-214677	N84-29893	#
BAE-ARG-188	N84-29887	
BBC-RD-1984/4	N84-30141	
BBC-RD-1984/6	N84-30142	
BBN-5324	N84-30892	#
BDX-613-3060	N84-30305	#
BDX-613-3062	N84-30302	#
BLL-M-28767-(5825.4)	N84-30885	
BLL-M-35571-(5828.4)	N84-30102	
BLL-M-35611-(5828.4)	N84-30220	
BLL-RISLEY-TR-4940-(9091.9F)	N84-30325	
BLL-RISLEY-TR-4941-(9091.9F)	N84-30326	
BLL-WH-558-(909A.9F)	N84-30221	
BM-IC-8964	N84-30172	#
BM-RI-8848	N84-30099	#
BM-RI-8851	N84-30098	#
BM-RI-8853	N84-30272	#
BM-RI-8856	N84-30101	#
BMFT-FB-T-84-080	N84-30549	#
BMFT-FB-T-84-082	N84-30096	#
BMFT-FB-W-84-022	N84-30270	#
BMI/ONWI-492	N84-30516	#
BNL-NUREG-34270	N84-30033	#
BNL-34061	N84-29995	#
BNL-34342	N84-30031	#
BNL-34390	N84-30192	#
BNL-34477	N84-30928	#
BNL-34479	N84-30196	#
BNL-34552	N84-30889	#
BNL-34569	N84-30905	#
BNL-34582	N84-30915	#
BNL-34594	N84-30093	#
BNL-34595	N84-30032	#
BNL-34604	N84-31020	#
BNL-34636	N84-30191	#
BNL-34641	N84-30923	#
BNL-51747	N84-30112	#
B8464514	N84-30060	#
B8464515	N84-30254	#
B8464516	N84-30718	#
B8464517	N84-30352	#
B8464518	N84-30558	#
B8467321	N84-30949	#
B8469329	N84-30792	#
CAD-SS-84-1	N84-30356	#
CALSPAN-7176-A-1	N84-29991	#
CEER-S-180	N84-30552	#
CETS/CND-027	N84-30590	#
CFD/83/7	N84-30255	#
CFD/84/1	N84-30256	#
CISE-2211	N84-30790	#
CMU-CS-84-123	N84-30777	#
CMU-RI-TR-84-12	N84-30129	#
CONF-408104-2	N84-30269	#
CONF-806114-1	N84-30958	#
CONF-830141-5	N84-30244	#

CONF-830311-PT-2 N84-30914 #
CONF-830573-11 N84-30052 #
CONF-830685-2 N84-30732 #
CONF-830719-60 N84-30056 #
CONF-830841-31 N84-30027 #
CONF-830911-39 N84-30909 #
CONF-830942-85 N84-31018 #
CONF-830974 N84-30540 #
CONF-831015-48 N84-30720 #
CONF-831069-5 N84-30609 #
CONF-831086-13 N84-30196 #
CONF-831203-145 N84-30807 #
CONF-831264-14 N84-30858 #
CONF-831265-4 N84-30284 #
CONF-831267-4 N84-31031 #
CONF-831278-1 N84-31029 #
CONF-840113-8 N84-30248 #
CONF-840142-5 N84-30912 #
CONF-840150-1 N84-31072 #
CONF-840150-4 N84-30921 #
CONF-840202-25 N84-30730 #
CONF-840218-7 N84-30046 #
CONF-840255-4 N84-30984 #
CONF-840255-5 N84-30986 #
CONF-840255-8 N84-30987 #
CONF-840255-9 N84-30853 #
CONF-840255-12 N84-30985 #
CONF-840255-14 N84-30989 #
CONF-840255-18 N84-30975 #
CONF-840255-19 N84-30854 #
CONF-840256-2 N84-30980 #
CONF-840256-3 N84-30235 #
CONF-840264-4 N84-30904 #
CONF-840264-5 N84-31020 #
CONF-840275-4 N84-30908 #
CONF-840276-1 N84-31041 #
CONF-840279-1 N84-30192 #
CONF-840280-3 N84-31081 #
CONF-840280-4 N84-31080 #
CONF-840284-1-REV-1 N84-31023 #
CONF-840288-1 N84-30095 #
CONF-840302-4 N84-30547 #
CONF-840304-3 N84-30025 #
CONF-840307-42 N84-30058 #
CONF-840311-10 N84-30982 #
CONF-840311-11 N84-30981 #
CONF-840370-1 N84-30841 #
CONF-840387-2 N84-30283 #
CONF-840387-7 N84-30279 #
CONF-840402-4 N84-30543 #
CONF-840402-5 N84-29995 #
CONF-840403-8 N84-30212 #
CONF-840405-12 N84-30032 #
CONF-840413-3 N84-30309 #
CONF-840413 11 N84-30296* #
CONF-840415-20 N84-30919 #
CONF-840417 N84-30029 #
CONF-840434-1 N84-30304 #
CONF-840448-4 N84-30313 #
CONF-840449-8 N84-30006 #
CONF-840481-5 N84-30928 #
CONF-840504-2 N84-30896 #
CONF-840508-1 N84-30539 #
CONF-840520-3 N84-31006 #
CONF-840520-4 N84-30997 #
CONF-840529-7 N84-30278 #
CONF-840529-8 N84-30280 #
CONF-840529-9 N84-30277 #
CONF-840529-11 N84-30165 #
CONF-840529-14 N84-30163 #
CONF-840529-23 N84-30920 #
CONF-840529-30 N84-30907 #
CONF-840555-3 N84-30925 #
CONF-840570-1 N84-30082 #
CONF-840577-5 N84-30260 #
CONF-840604-5 N84-30034 #
CONF-840604-6 N84-30053 #
CONF-840614-22 N84-30236 #
CONF-840614-31 N84-30238 #
CONF-840614-39 N84-30971 #
CONF-840616-1 N84-30976 #
CONF-840616-2 N84-30993 #
CONF-840616-4 N84-30992 #
CONF-840616-5 N84-30576 #
CONF-840616-6 N84-30973 #
CONF-840616-7 N84-31017 #
CONF-840616-8 N84-30990 #
CONF-840616-9 N84-30991 #
CONF-840616-11 N84-30276 #
CONF-840616-12 N84-30972 #
CONF-840616-13 N84-30582 #
CONF-840616-15 N84-30289 #
CONF-840617-1 N84-30007 #
CONF-840622-1 N84-30532 #
CONF-840629-1 N84-30917 #
CONF-840629-2 N84-30285 #
CONF-840632-1 N84-30344 #
CONF-840633-9 N84-30349 #
CONF-840633-13 N84-30945 #
CONF-840636-REV-1 N84-30806 #
CONF-840647-1 N84-30237 #
CONF-840650-1 N84-30837 #
CONF-840653-1 N84-30268 #
CONF-840653-2 N84-30026 #
CONF-840653-3 N84-30132 #
CONF-840664-1 N84-30043 #
CONF-840664-2 N84-30049 #
CONF-840664-5 N84-31025 #
CONF-840664-6 N84-30033 #
CONF-840668-1 N84-30602 #
CONF-840689-1 N84-29996 #
CONF-840702-7 N84-30088 #
CONF-840706-1 N84-30860 #
CONF-840711-2 N84-30057 #
CONF-840809-10 N84-30580 #
CONF-840813-10 N84-29997 #
CONF-8305137 N84-30536 #
CONF-8306195-1 N84-30004 #
CONF-8309170-7 N84-30054 #
CONF-8309229-1 N84-30087 #
CONF-8310268-1 N84-30202 #
CONF-8311100-REV-1 N84-30577 #
CONF-8311134-1 N84-30210 #
CONF-8311134-5 N84-30206 #
CONF-8311144-1 N84-30926 #
CONF-8403100-5 N84-30194 #
CONF-8403101-6 N84-30947 #
CONF-8403112-1 N84-30905 #
CONF-8403112-2 N84-30915 #
CONF-8403112-3 N84-30929 #
CONF-8403116-1 N84-30190 #
CONF-8403118-1 N84-30807 #
CONF-8404103-2 N84-30028 #
CONF-8404104-2 N84-30312 #
CONF-8404116-2 N84-30303 #
CONF-8404119-1 N84-30923 #
CONF-8404119-2 N84-31028 #
CONF-8404124-3 N84-30813 #
CONF-8404124-4 N84-30288 #
CONF-8404136-1 N84-31053 #
CONF-8404143-2 N84-30906 #
CONF-8404152-1 N84-30803 #
CONF-8404158-1 N84-30815 #
CONF-8404160-1 N84-30323 #
CONF-8404165-1 N84-30787 #
CONF-8405131-1 N84-30785 #
CONF-8405131-4 N84-30780 #
CONF-8405131-5 N84-30804 #
CONF-8405147-1 N84-30727 #
CONF-8405148-1 N84-31054 #
CONF-8405161-1 N84-30314 #
CONF-8405163-2 N84-31000 #
CONF-8405163-3 N84-31001 #
CONF-8405163-5 N84-31005 #
CONF-8405183-1 N84-30104 #
CONF-8406100-1 N84-30199 #
CONF-8406100-2 N84-30211 #
CONF-8406101-1 N84-30346 #
CONF-8406103-1 N84-30107 #
CONF-8406113-2 N84-30889 #

COO-2009-148 N84-30903 #

CPIA-PUBL-390-VOL-1 N84-29906 #
CPIA-PUBL-390-VOL-2 N84-29939 #

CRINC/RSL-TR-419-2 N84-30148 #

CWI-NM-N8401 N84-30792 #

CWRUTH-83-7 N84-30939 #

DC-61 N84-30821 #
DC-62 N84-30822 #

DE83-015926 N84-30539 #
DE83-017203 N84-30050 #
DE83-017536 N84-30540 #
DE84-000006 N84-30605 #
DE84-000079 N84-30535 #
DE84-000081 N84-30534 #
DE84-000083 N84-30536 #
DE84-000090 N84-30084 #
DE84-000095 N84-31057 #
DE84-000529 N84-30672 #
DE84-002457 N84-30720 #
DE84-002724 N84-30806 #
DE84-003087 N84-30585 #
DE84-003573 N84-30056 #
DE84-003818 N84-30268 #
DE84-004031 N84-30237 #
DE84-004034 N84-30925 #
DE84-004320 N84-30837 #
DE84-004386 N84-30111 #
DE84-004433 N84-30543 #
DE84-004489 N84-31026 #
DE84-004491 N84-30537 #
DE84-005411 N84-30043 #
DE84-005520 N84-30532 #
DE84-005831 N84-30234 #
DE84-006033 N84-30860 #
DE84-006133 N84-30132 #
DE84-006153 N84-30308 #
DE84-006298 N84-30026 #
DE84-006407 N84-30236 #
DE84-006415 N84-30049 #
DE84-006434 N84-30057 #
DE84-006449 N84-30260 #
DE84-006553 N84-30238 #
DE84-006554 N84-30971 #
DE84-006663 N84-30917 #
DE84-006722 N84-30602 #
DE84-007318 N84-30673 #
DE84-007368 N84-30042 #
DE84-007400 N84-30914 #
DE84-007486 N84-30285 #
DE84-007477 N84-30853 #
DE84-007490 N84-30984 #
DE84-007491 N84-30987 #
DE84-007491 N84-30989 #
DE84-007493 N84-30985 #
DE84-007494 N84-30986 #
DE84-007695 N84-30031 #
DE84-007911 N84-30913 #
DE84-007916 N84-30239 #
DE84-007954 N84-30983 #
DE84-007973 N84-30809 #
DE84-008014 N84-30996 #
DE84-008018 N84-30926 #
DE84-008242 N84-30027 #
DE84-008244 N84-30107 #
DE84-008296 N84-29996 #
DE84-008325 N84-30344 #
DE84-008348 N84-30283 #
DE84-008495 N84-30210 #
DE84-008551 N84-30840 #
DE84-008579 N84-30904 #
DE84-008589 N84-30311 #
DE84-008649 N84-31041 #
DE84-008652 N84-30025 #
DE84-008664 N84-30048 #
DE84-008665 N84-30970 #
DE84-008668 N84-31027 #
DE84-008802 N84-30133 #
DE84-008894 N84-31023 #
DE84-008903 N84-30161 #
DE84-008904 N84-29967 #
DE84-008905 N84-30250 #
DE84-008945 N84-30276 #
DE84-008947 N84-30192 #
DE84-008973 N84-30206 #
DE84-008975 N84-30209 #
DE84-008977 N84-30310 #
DE84-008982 N84-30195 #
DE84-008986 N84-30088 #
DE84-008998 N84-29997 #
DE84-009032 N84-30610 #
DE84-009045 N84-30946 #
DE84-009064 N84-30199 #
DE84-009065 N84-30211 #
DE84-009067 N84-30346 #
DE84-009080 N84-30927 #
DE84-009091 N84-30839 #
DE84-009101 N84-30941 #
DE84-009126 N84-30931 #
DE84-009139 N84-30908 #
DE84-009152 N84-31025 #
DE84-009180 N84-30781 #
DE84-009188 N84-30976 #
DE84-009225 N84-30912 #
DE84-009233 N84-30249 #
DE84-009242 N84-30784 #
DE84-009401 N84-30841 #
DE84-009402 N84-30993 #
DE84-009432 N84-30557 #
DE84-009474 N84-30538 #
DE84-009485 N84-30269 #
DE84-009486 N84-30785 #
DE84-009585 N84-30304 #
DE84-009624 N84-30108 #
DE84-009668 N84-30930 #
DE84-009669 N84-30202 #
DE84-009679 N84-30518 #
DE84-009683 N84-30991 #
DE84-009693 N84-30110 #
DE84-009757 N84-30546 #
DE84-009758 N84-30545 #
DE84-009762 N84-30606 #

DE84-009849 .... N84-30051 #
DE84-009874 .... N84-30312 #
DE84-009916 .... N84-30109 #
DE84-009921 .... N84-30095 #
DE84-009927 .... N84-30945 #
DE84-009970 .... N84-30990 #
DE84-009973 .... N84-30972 #
DE84-009986 .... N84-30780 #
DE84-009988 .... N84-30992 #
DE84-009994 .... N84-30576 #
DE84-010004 .... N84-30973 #
DE84-010052 .... N84-30349 #
DE84-010053 .... N84-31072 #
DE84-010054 .... N84-30854 #
DE84-010059 .... N84-30807 #
DE84-010062 .... N84-30947 #
DE84-010064 .... N84-30975 #
DE84-010066 .... N84-30039 #
DE84-010071 .... N84-30813 #
DE84-010074 .... N84-30582 #
DE84-010101 .... N84-30113 #
DE84-010113 .... N84-30835 #
DE84-010131 .... N84-30046 #
DE84-010145 .... N84-31017 #
DE84-010217 .... N84-29995 #
DE84-010230 .... N84-30251 #
DE84-010282 .... N84-30915 #
DE84-010287 .... N84-30196 #
DE84-010294 .... N84-30869 #
DE84-010327 .... N84-30259 #
DE84-010397 .... N84-30034 #
DE84-010402 .... N84-30035 #
DE84-010410 .... N84-30833 #
DE84-010423 .... N84-30729 #
DE84-010424 .... N84-30922 #
DE84-010425 .... N84-31016 #
DE84-010428 .... N84-30029 #
DE84-010460 .... N84-30533 #
DE84-010485 .... N84-30531 #
DE84-010505 .... N84-30190 #
DE84-010507 .... N84-30974 #
DE84-010514 .... N84-30033 #
DE84-010536 .... N84-30896 #
DE84-010558 .... N84-30909 #
DE84-010573 .... N84-30240 #
DE84-010576 .... N84-30962 #
DE84-010577 .... N84-30979 #
DE84-010579 .... N84-30783 #
DE84-010586 .... N84-30961 #
DE84-010591 .... N84-30342 #
DE84-010593 .... N84-30903 #
DE84-010603 .... N84-31055 #
DE84-010629 .... N84-29998 #
DE84-010665 .... N84-30166 #
DE84-010674 .... N84-31039 #
DE84-010675 .... N84-31038 #
DE84-010676 .... N84-30247 #
DE84-010679 .... N84-30544 #
DE84-010710 .... N84-30902 #
DE84-010713 .... N84-30083 #
DE84-010716 .... N84-30929 #
DE84-010718 .... N84-30958 #
DE84-010719 .... N84-30858 #
DE84-010729 .... N84-30908 #
DE84-010731 .... N84-30904 #
DE84-010747 .... N84-30834 #
DE84-010750 .... N84-30782 #
DE84-010766 .... N84-30305 #
DE84-010768 .... N84-30302 #
DE84-010789 .... N84-30928 #
DE84-010793 .... N84-30905 #
DE84-010797 .... N84-31020 #
DE84-010814 .... N84-30978 #
DE84-010822 .... N84-30241 #
DE84-010826 .... N84-30578 #
DE84-010842 .... N84-30999 #
DE84-010862 .... N84-30089 #
DE84-010874 .... N84-30282 #
DE84-010880 .... N84-30923 #
DE84-010889 .... N84-30093 #
DE84-010890 .... N84-30032 #
DE84-010918 .... N84-30779 #
DE84-010926 .... N84-30584 #
DE84-010936 .... N84-30541 #
DE84-010952 .... N84-31056 #
DE84-010953 .... N84-30835 #
DE84-010957 .... N84-31042 #
DE84-010958 .... N84-30242 #
DE84-010960 .... N84-30086 #
DE84-010963 .... N84-30191 #
DE84-010968 .... N84-30859 #
DE84-010972 .... N84-31053 #
DE84-010986 .... N84-30577 #
DE84-010992 .... N84-30288 #
DE84-010993 .... N84-31018 #
DE84-010996 .... N84-30583 #
DE84-010998 .... N84-30245 #
DE84-011015 .... N84-30943 #
DE84-011019 .... N84-30836 #
DE84-011021 .... N84-30203 #
DE84-011024 .... N84-30200 #
DE84-011025 .... N84-30855 #
DE84-011030 .... N84-30918 #
DE84-011031 .... N84-30044 #
DE84-011034 .... N84-30040 #
DE84-011035 .... N84-30347 #
DE84-011037 .... N84-30038 #
DE84-011038 .... N84-31019 #
DE84-011045 .... N84-30041 #
DE84-011049 .... N84-31021 #
DE84-011065 .... N84-30948 #
DE84-011066 .... N84-30244 #
DE84-011070 .... N84-30942 #
DE84-011071 .... N84-30921 #
DE84-011072 .... N84-30727 #
DE84-011080 .... N84-29979 #
DE84-011081 .... N84-30037 #
DE84-011082 .... N84-29999 #
DE84-011087 .... N84-30090 #
DE84-011090 .... N84-30977 #
DE84-011091 .... N84-30263 #
DE84-011093 .... N84-30204 #
DE84-011094 .... N84-30264 #
DE84-011095 .... N84-30085 #
DE84-011098 .... N84-30201 #
DE84-011100 .... N84-30916 #
DE84-011101 .... N84-30307 #
DE84-011103 .... N84-30267 #
DE84-011109 .... N84-30959 #
DE84-011111 .... N84-30261 #
DE84-011115 .... N84-30205 #
DE84-011116 .... N84-30266 #
DE84-011127 .... N84-30604 #
DE84-011150 .... N84-30960 #
DE84-011157 .... N84-30608 #
DE84-011163 .... N84-30164 #
DE84-011167 .... N84-30306 #
DE84-011202 .... N84-30059 #
DE84-011205 .... N84-31054 #
DE84-011254 .... N84-31022 #
DE84-011260 .... N84-30286 #
DE84-011271 .... N84-30345 #
DE84-011279 .... N84-30000 #
DE84-011281 .... N84-30857 #
DE84-011283 .... N84-30295 #
DE84-011295 .... N84-30265 #
DE84-011298 .... N84-30895 #
DE84-011300 .... N84-30262 #
DE84-011301 .... N84-30281 #
DE84-011305 .... N84-30856 #
DE84-011308 .... N84-30243 #
DE84-011327 .... N84-30165 #
DE84-011329 .... N84-31031 #
DE84-011332 .... N84-30277 #
DE84-011336 .... N84-30289 #
DE84-011341 .... N84-30910 #
DE84-011342 .... N84-30804 #
DE84-011345 .... N84-30047 #
DE84-011347 .... N84-30279 #
DE84-011348 .... N84-30278 #
DE84-011352 .... N84-30235 #
DE84-011353 .... N84-30980 #
DE84-011354 .... N84-30919 #
DE84-011356 .... N84-30092 #
DE84-011366 .... N84-30163 #
DE84-011369 .... N84-30194 #
DE84-011371 .... N84-30284 #
DE84-011373 .... N84-30580 #
DE84-011384 .... N84-30248 #
DE84-011386 .... N84-31052 #
DE84-011387 .... N84-30811 #
DE84-011399 .... N84-30805 #
DE84-011401 .... N84-30030 #
DE84-011402 .... N84-31071 #
DE84-011403 .... N84-30197 #
DE84-011406 .... N84-30002 #
DE84-011408 .... N84-30920 #
DE84-011409 .... N84-30082 #
DE84-011412 .... N84-30911 #
DE84-011416 .... N84-30280 #
DE84-011453 .... N84-30003 #
DE84-011458 .... N84-30028 #
DE84-011460 .... N84-30309 #
DE84-011475 .... N84-31007 #
DE84-011498 .... N84-30838 #
DE84-011502 .... N84-30933 #
DE84-011507 .... N84-30313 #
DE84-011523 .... N84-30198 #
DE84-011527 .... N84-30969 #
DE84-011533 .... N84-30091 #
DE84-011598 .... N84-30517 #
DE84-011603 .... N84-30001 #
DE84-011619 .... N84-30348 #
DE84-011620 .... N84-30516 #
DE84-011626 .... N84-30788 #
DE84-011631 .... N84-30303 #
DE84-011633 .... N84-30296* #
DE84-011655 .... N84-30006 #
DE84-011666 .... N84-30815 #
DE84-011686 .... N84-30547 #
DE84-011719 .... N84-30094 #
DE84-011753 .... N84-30178 #
DE84-011756 .... N84-30207 #
DE84-011764 .... N84-30924 #
DE84-011810 .... N84-31028 #
DE84-011823 .... N84-30106 #
DE84-011824 .... N84-30944 #
DE84-011827 .... N84-30131 #
DE84-011870 .... N84-30058 #
DE84-011874 .... N84-30004 #
DE84-011899 .... N84-30323 #
DE84-011901 .... N84-30730 #
DE84-012030 .... N84-30036 #
DE84-012032 .... N84-30162 #
DE84-012033 .... N84-30045 #
DE84-012050 .... N84-31024 #
DE84-012052 .... N84-30542 #
DE84-012072 .... N84-30907 #
DE84-012092 .... N84-30803 #
DE84-012104 .... N84-30906 #
DE84-012111 .... N84-30053 #
DE84-012115 .... N84-30728 #
DE84-012118 .... N84-30193 #
DE84-012127 .... N84-30548 #
DE84-012131 .... N84-30778 #
DE84-012136 .... N84-30055 #
DE84-012165 .... N84-31029 #
DE84-012189 .... N84-30579 #
DE84-012214 .... N84-30613 #
DE84-012216 .... N84-30612 #
DE84-012230 .... N84-30789 #
DE84-012231 .... N84-30350 #
DE84-012235 .... N84-30997 #
DE84-012242 .... N84-30287 #
DE84-012256 .... N84-30586 #
DE84-012267 .... N84-30104 #
DE84-012329 .... N84-31006 #
DE84-012336 .... N84-30052 #
DE84-012340 .... N84-30212 #
DE84-012369 .... N84-30581 #
DE84-012374 .... N84-30732 #
DE84-012379 .... N84-30314 #
DE84-012391 .... N84-31000 #
DE84-012396 .... N84-31002 #
DE84-012410 .... N84-30246 #
DE84-012413 .... N84-30932 #
DE84-012418 .... N84-30995 #
DE84-012419 .... N84-30290 #
DE84-012442 .... N84-31080 #
DE84-012466 .... N84-30291 #
DE84-012475 .... N84-30005 #
DE84-012485 .... N84-31004 #
DE84-012487 .... N84-31005 #
DE84-012498 .... N84-31030 #
DE84-012526 .... N84-30787 #
DE84-012527 .... N84-31003 #
DE84-012533 .... N84-31001 #
DE84-012547 .... N84-30519 #
DE84-012583 .... N84-31081 #
DE84-012599 .... N84-30807 #
DE84-012681 .... N84-30814 #
DE84-012811 .... N84-30007 #
DE84-012833 .... N84-30054 #
DE84-012870 .... N84-30934 #
DE84-012876 .... N84-30112 #
DE84-012920 .... N84-30842 #
DE84-012993 .... N84-30998 #
DE84-013094 .... N84-30731 #
DE84-013109 .... N84-30897 #
DE84-013189 .... N84-30786 #
DE84-013321 .... N84-30587 #
DE84-020802 .... N84-30087 #
DE84-900635 .... N84-30208 #
DE84-900907 .... N84-31065 #
DE84-901150 .... N84-31040 #

DFVLR-FB-84-15 .... N84-29862 #
DFVLR-FB-84-16 .... N84-30252 #
DFVLR-FB-84-18 .... N84-30589 #

DIA-DST-2700Z-002-84 .... N84-30275 #

DO-TH-83-16 .... N84-30939 #

DOE/CE-0062 .... N84-30541 #
DOE/CE-0072 .... N84-30544 #
DOE/CE-15095/T1 .... N84-31042 #
DOE/CE-15095/14 .... N84-31056 #

DOE/CE-15151/1-VOL-1-EXEC-SUMM .... N84-31038 #
DOE/CE-15151/1-VOL-2 .... N84-31039 #
DOE/CE-30719/T2 .... N84-30542 #
DOE/CE-40652/1 .... N84-30310 #

DOE/CH-00178/T20-VOL-1 .... N84-31052 #
DOE/CH-10122/11 .... N84-30781 #
DOE/CH-10122/25 .... N84-30538 #

DOE/CS-15074/T4 .... N84-30195 #
DOE/CS-30569/29 .... N84-30234 #
DOE/CS-40520/T2 .... N84-30133 #

DOE/DP-40092/3 .... N84-30290 #
DOE/DP-40092/4 .... N84-30995 #
DOE/DP-40124/32 .... N84-31001 #
DOE/DP-40124/34 .... N84-31005 #
DOE/DP-40124/38 .... N84-31000 #
DOE/DP-40124/40 .... N84-30960 #
DOE/DP-40135/1 .... N84-31004 #
DOE/DP-40137/2 .... N84-30286 #
DOE/DP-40152/T5 .... N84-30974 #

DOE/ER-01198/1407 .... N84-30048 #
DOE/ER-02009/148 .... N84-30903 #
DOE/ER-03077/T1 .... N84-30994 #
DOE/ER-03992/539 .... N84-30839 #
DOE/ER-03992/552 .... N84-30933 #
DOE/ER-05126/207 .... N84-30926 #
DOE/ER-10367/14 .... N84-30051 #
DOE/ER-10369/T2 .... N84-30003 #
DOE/ER-10556/98 .... N84-30350 #
DOE/ER-10624/4 .... N84-31022 #
DOE/ER-10660/T2 .... N84-30922 #
DOE/ER-10691/T1 .... N84-30611 #
DOE/ER-10708/T1 .... N84-30069 #
DOE/ER-10708/T2 .... N84-30059 #
DOE/ER-10711/3 .... N84-30838 #
DOE/ER-10865/T1 .... N84-30259 #
DOE/ER-10911/6 .... N84-30005 #
DOE/ER-10972/T2 .... N84-30050 #
DOE/ER-13026/2 .... N84-30533 #
DOE/ER-13127/03 .... N84-30291 #
DOE/ER-13163/2 .... N84-30311 #
DOE/ER-30042/T1 .... N84-30946 #
DOE/ER-40068/1-PT-2 .... N84-30914 #
DOE/ER-40069/1 .... N84-31024 #
DOE/ER-53110/1 .... N84-30970 #
DOE/ER-53126/T1 .... N84-30978 #
DOE/ER-53162/3 .... N84-31002 #

DOE/ET-15450/T29 .... N84-30111 #
DOE/ET-20342/T12 .... N84-30948 #
DOE/ET-27014/T17 .... N84-30519 #
DOE/ET-27205/T1 .... N84-30518 #
DOE/ET-28407/4 .... N84-30517 #
DOE/ET-51013/112 .... N84-30983 #
DOE/ET-51013/119 .... N84-30982 #
DOE/ET-51013/120 .... N84-30979 #
DOE/ET-51013/121 .... N84-30981 #
DOE/ET-53051/66 .... N84-30998 #
DOE/ET-53088/132 .... N84-31003 #
DOE/ET-53088/135 .... N84-30859 #
DOE/ET-53136/7 .... N84-30988 #

DOE/EV-00902/35 .... N84-30635 #
DOE/EV-01332/1 .... N84-30673 #

DOE/ID-12057/T6 .... N84-30578 #
DOE/ID-12079/106 .... N84-30579 #

DOE/LC-10886/1556 .... N84-30585 #

DOE/MC-20212/1569 .... N84-30531 #

DOE/NBM-4009101 .... N84-30941 #

DOE/PC-30026/T5 .... N84-30251 #
DOE/PC-50798/T5 .... N84-30241 #
DOE/PC-50810/T6 .... N84-30109 #
DOE/PC-60019/1 .... N84-30108 #

DOE/RL-01830/T16 .... N84-30613 #
DOE/RL-01830/T17 .... N84-30612 #

DOE/RW-83/160 .... N84-30950 #

DOE/R7-01219/T1 .... N84-30606 #
DOE/R7-01221/T1 .... N84-30545 #
DOE/R7-01221/T3 .... N84-30546 #

DOE/SF-11564/6 .... N84-30246 #

DOT-TSC-RSPA-83-14 .... N84-30624 #
DOT-TSC-RSPA-83-15 .... N84-30625 #

DOT/FAA/CT-84/8 .... N84-29859 #

DOT/FAA/ES-83/12 .... N84-29848 #

DP-MS-83-123 .... N84-30313 #

DREO-TN-83-25 .... N84-30178 #

DTIC/TR-83/1 .... N84-31049 #
DTIC/TR-84/2 .... N84-31051 #
DTIC/TR-84/5 .... N84-31049 #

DTNSRDC-84/027 .... N84-30018 #
DTNSRDC-84/034 .... N84-30231 #

DTNSRDC/SME-83-104 .... N84-30023 #

E-1296 .... N84-30294* #
E-1950 .... N84-29870* #
E-1967 .... N84-30528* #
E-1986 .... N84-30072* #
E-2167 .... N84-30293* #
E-2175 .... N84-30329* #
E-2207 .... N84-30223* #
E-2217 .... N84-30224* #
E-2218 .... N84-29878* #
E-2226 .... N84-29876* #
E-2236 .... N84-30147* #
E-2241 .... N84-30273* #
E-2247 .... N84-30146* #

EEB-W-84-04 .... N84-31029 #

EGG-M-06084 .... N84-30787 #

EGG-SCM-6572 .... N84-30092 #

EL-TR-84-13 .... N84-30145* #

EPA-AA-TSS-83-10 .... N84-30559 #

EPA-600/D-84-098 .... N84-30525 #
EPA-600/2-84-087 .... N84-30719 #
EPA-600/3-83-072 .... N84-30524 #
EPA-600/3-84-061 .... N84-30556 #
EPA-600/3-84-062 .... N84-30012 #
EPA-600/4-84-034 .... N84-30560 #
EPA-600/9-84-010 .... N84-30562 #

EPFL/LTA-TM-3-84 .... N84-29880 #
EPFL/LTA-TM-83-2 .... N84-30297 #

EPRI-EA-3356-VOL-1 .... N84-30557 #

EPRI-EM-2995 .... N84-30548 #

ERIM-155900-17-T .... N84-30633 #
ERIM-163500-4-T .... N84-30514 #

ESA-BR-12 .... N84-30317 #
ESA-BR-19 .... N84-29890 #

ESA-PSS-01-707 .... N84-30215 #

ESA-STR-208 .... N84-29904 #

ESA-TT-843 .... N84-31083 #
ESA-TT-858 .... N84-29850 #
ESA-TT-888 .... N84-29862 #
ESA-TT-889 .... N84-30252 #

ESD-TR-84-169 .... N84-30154 #

ESL-123 .... N84-30579 #

ETL-0349 .... N84-30726 #
ETL-0357 .... N84-30511* #

ETS-RR-84-13-ONR .... N84-30699 #

E84-10166 .... N84-30359* #
E84-10167 .... N84-30380* #

FAA-ARP-84-2 .... N84-29889 #

FAA-CT-84-5 .... N84-30073 #

FAA-I-84-6-1 .... N84-30334* #

FAA-83-4-1-VOL-1 .... N84-29881 #

FAA/CT-83/15 .... N84-30698 #

FDA/NCDRH-84-24 .... N84-30271 #

FERMILAB/TM-1253 .... N84-30902 #

FHWA/OH-83/002 .... N84-30135 #

FIPS-PUB-102 .... N84-30736 #

FOA-C-20538-T1 .... N84-31058 #
FOA-C-52005-H4 .... N84-30692 #

FSGTR/INT-160 .... N84-30615 #

FTD-ID(RS)T-1868-83 .... N84-30063 #

FZM-7184 .... N84-30073 #

F83-06 .... N84-30699 #

GA-A-17388 .... N84-30993 #
GA-A-17510 .... N84-30841 #

GA-A17483 .... N84-30976 #

GAO/NSIAD-84-100 .... N84-31044 #

GAO/RCED-83-103 .... N84-30570 #
GAO/RCED-83-179 .... N84-29858 #
GAO/RCED-84-124 .... N84-29893 #

GIT-TR-84-1 .... N84-30700 #

GPO-29-522 .... N84-30702 #
GPO-29-567 .... N84-31064 #
GPO-31-006 .... N84-31063 #

GRI-84/0036 .... N84-30138 #

GTFR-47 .... N84-30996 #

GWU/IMSE/SERIAL-T-487/84 .... N84-31034 #

H-REPT-98-647 .... N84-31063 #

H-1242 .... N84-29863* #
H-1243 .... N84-29879* #
H-1245 .... N84-29884* #
H-1246 .... N84-29885* #

HDL-TR-2035 .... N84-31015 #

HEDL-SA-3005-FP .... N84-30034 #
HEDL-SA-3077-FP .... N84-30314 #

HEDL-7432 .... N84-30035 #

HHS/PUB-FDA-84-8222 .... N84-30271 #

ICASE-84-26 .... N84-29903* #
ICASE-84-29 .... N84-30816* #
ICASE-84-30 .... N84-30817* #
ICASE-84-31 .... N84-30818* #
ICASE-84-32 .... N84-29852* #
ICASE-84-33 .... N84-30800* #

ICMA-84-71 .... N84-30830 #

ICS-8406 .... N84-31050 #

IDA-D-19 .... N84-29873 #
IDA-D-21 .... N84-29874 #
IDA-D-23 .... N84-29860 #
IDA-D-26 .... N84-30322 #

IDA/HQ-83-25894 .... N84-29873 #
IDA/HQ-83-25895 .... N84-29874 #
IDA/HQ-83-25935 .... N84-29860 #
IDA/HQ-83-25936 .... N84-30322 #

IOS-166 .... N84-30950 #

IPP-2/271 .... N84-30327
IPP-6/234 .... N84-30961

IPPJ-674 .... N84-30966 #
IPPJ-675 .... N84-30965 #
IPPJ-676 .... N84-30964 #
IPPJ-677 .... N84-30963 #

IR-1 .... N84-30513 #
IR-10 .... N84-30597 #

IS-M-474 .... N84-30054 #

IS-T-1069 .... N84-30042 #

ISAS-SP-2 .... N84-30114 #

ISAS-610 .... N84-30103 #
ISAS-611 .... N84-30568 #

ISAS-612 .... N84-31008 #

ISBN-0-387-90966-4 .... N84-30994 #
ISBN-3-540-90966-4 .... N84-30994 #
ISBN-3-7083-0059-0 .... N84-31082 #
ISBN-90-363-0005-X .... N84-30060 #
ISBN-90-363-0006-8 .... N84-30254 #
ISBN-90-363-0007-6 .... N84-30718 #
ISBN-90-363-0008-4 .... N84-30352 #
ISBN-90-363-0009-2 .... N84-30558 #
ISBN-951-38-2014-9 .... N84-30318 #

ISI-41 .... N84-30802 #

ISI/TM-80-18.1 .... N84-30772 #

ISS-L-84/3 .... N84-30693 #

ISSN-92-63-10628-2 .... N84-30614 #
ISSN-0027-657X .... N84-30174 #
ISSN-0027-657X .... N84-30175 #
ISSN-0143-7313 .... N84-30292
ISSN-0167-8590 .... N84-30060 #
ISSN-0167-8590 .... N84-30254 #
ISSN-0167-8590 .... N84-30352 #
ISSN-0167-8590 .... N84-30558 #
ISSN-0167-8590 .... N84-30718 #
ISSN-0170-1339 .... N84-30270 #
ISSN-0250-1589 .... N84-29890 #
ISSN-0250-1589 .... N84-30317 #
ISSN-0282-5369 .... N84-30143
ISSN-0285-6808 .... N84-30103 #
ISSN-0285-6808 .... N84-30114 #
ISSN-0285-6808 .... N84-30568 #
ISSN-0285-6808 .... N84-30569 #
ISSN-0285-6808 .... N84-31008 #
ISSN-0340-7608 .... N84-30096 #
ISSN-0340-7608 .... N84-30549 #
ISSN-0347-3694 .... N84-31058 #
ISSN-0347-7665 .... N84-30692 #
ISSN-0348-296X .... N84-30699 #
ISSN-0349-2699 .... N84-30588 #
ISSN-0358-5069 .... N84-30318 #
ISSN-0379-4059 .... N84-30215 #
ISSN-0379-4067 .... N84-29904 #
ISSN-0436-1199 .... N84-30008 #
ISSN-0436-1199 .... N84-30010 #
ISSN-0436-1199 .... N84-30935 #
ISSN-0436-1199 .... N84-30936 #
ISSN-0469-4236 .... N84-30495 #
ISSN-0531-4496 .... N84-31067 #

ISVR-TR-123 .... N84-30694 #

ISWS/CON-340-84-VOL-1 .... N84-30620 #

ITR-163 .... N84-30184 #

IZF-1983-25 .... N84-30315 #
IZF-1984-4 .... N84-30213 #

JPL-D-879 .... N84-30511* #

JPRS-UBB-84-016 .... N84-30675 #

JPRS-UES-84-006 .... N84-30479 #

JPRS-UPM-84-001 .... N84-30862 #

JPRS-USB-84-005 .... N84-30642 #

K/PS-5033 .... N84-30057 #

KMO-23 .... N84-30567 #

KMSF-U-1445 .... N84-30269 #

L-15693 .... N84-30014* #
L-15791 .... N84-30665* #
L-15834 .... N84-29969* #

LA-UR-83-2258 .... N84-30539 #
LA-UR-83-3422 .... N84-30268 #
LA-UR-83-3649 .... N84-30637 #
LA-UR-84-348 .... N84-30860 #
LA-UR-84-620 .... N84-30967 #
LA-UR-84-621 .... N84-30966 #
LA-UR-84-622 .... N84-30984 #
LA-UR-84-623 .... N84-30969 #
LA-UR-84-626 .... N84-30965 #
LA-UR-84-633 .... N84-30653 #
LA-UR-84-635 .... N84-30285 #
LA-UR-84-748 .... N84-30975 #
LA-UR-84-806 .... N84-30607 #
LA-UR-84-823 .... N84-30947 #
LA-UR-84-826 .... N84-31072 #
LA-UR-84-829 .... N84-30349 #
LA-UR-84-870 .... N84-30654 #
LA-UR-84-892 .... N84-30582 #
LA-UR-84-910 .... N84-30613 #
LA-UR-84-923 .... N84-30990 #
LA-UR-84-942 .... N84-30972 #
LA-UR-84-1047 .... N84-30780 #
LA-UR-84-1063 .... N84-30992 #
LA-UR-84-1067 .... N84-30576 #
LA-UR-84-1127 .... N84-30973 #
LA-UR-84-1154 .... N84-30289 #
LA-UR-84-1166 .... N84-30560 #
LA-UR-84-1190 .... N84-30284 #
LA-UR-84-1191 .... N84-30278 #
LA-UR-84-1199 .... N84-30235 #
LA-UR-84-1217 .... N84-30277 #
LA-UR-84-1235 .... N84-30919 #
LA-UR-84-1236 .... N84-30248 #
LA-UR-84-1249 .... N84-30194 #
LA-UR-84-1279 .... N84-30165 #
LA-UR-84-1281 .... N84-30920 #
LA-UR-84-1307 .... N84-30910 #
LA-UR-84-1308 .... N84-30163 #
LA-UR-84-1311 .... N84-31031 #
LA-UR-84-1324 .... N84-30604 #
LA-UR-84-1349 .... N84-30280 #
LA-UR-84-1354 .... N84-30082 #
LA-UR-84-1359 .... N84-30911 #
LA-UR-84-1384 .... N84-30279 #
LA-UR-84-1391 .... N84-30980 #
LA-UR-84-1666 .... N84-31081 #
LA-UR-84-1667 .... N84-31080 #

LA-9648-MS .... N84-30583 #
LA-9974-T .... N84-30927 #
LA-10025 .... N84-30245 #
LA-10035-MS .... N84-30203 #
LA-10048-MS .... N84-30836 #
LA-10057-PR .... N84-30943 #
LA-10059-PR .... N84-30200 #

LALP-84-18 .... N84-30855 #

LBL-PUB-3038 .... N84-30784 #

LBL-14083 .... N84-30783 #
LBL-16263 .... N84-30202 #
LBL-16425 .... N84-30609 #
LBL-16528 .... N84-30027 #
LBL-16959 .... N84-30083 #
LBL-17256 .... N84-30912 #
LBL-17283 .... N84-30858 #
LBL-17306 .... N84-30930 #
LBL-17363 .... N84-30210 #
LBL-17369 .... N84-30087 #
LBL-17386 .... N84-30958 #
LBL-17393 .... N84-31029 #
LBL-17481 .... N84-30110 #
LBL-17575 .... N84-30929 #
LBL-17666 .... N84-30004 #
LBL-17716 .... N84-30586 #

LC-83-600349 .... N84-30099 #
LC-83-600350 .... N84-30101 #
LC-83-600353 .... N84-30272 #
LC-84-601006 .... N84-30139 #
LC-84-601014 .... N84-30561 #
LC-84-601045 .... N84-30740 #
LC-84-601055 .... N84-30739 #

LEOK-TR-1984-02-PT-1 .... N84-30167 #
LEOK-TR-1984-04 .... N84-30168 #

LFD-223 .... N84-30144

LIDS-P-1312 .... N84-30808* #

LIDS-TH-1353 .... N84-30155 #

LMDC-TR-84-4 .... N84-31035 #

LMSC-D913930 .... N84-30151 #
LMSC-D973431 .... N84-30529* #

M/T3B-9201-VOL-1 .... N84-29881 #

MATHS-RES-177 .... N84-30324 #

MIT/EL-84-002 .... N84-30563 #

MMS/AT/ES-84/10-VOL-1 .... N84-30639 #
MMS/AT/ES-84/11-VOL-2 .... N84-30640 #
MMS/AT/ES-84/12-VOL-3 .... N84-30641 #

MPAE-L-66-84-10 .... N84-31059 #

MPIS-3/1984 .... N84-30936 #
MPIS-6/1984 .... N84-30010 #
MPIS-17/1983 .... N84-30008 #
MPIS-18/1983 .... N84-30935 #

MRL-R-924 .... N84-30332 #

MSRR-500 .... N84-31036 #

MSSU-TFD-84-1 .... N84-30227 #

MTPR-7 .... N84-30013* #

MTR-83W203 .... N84-30737* #
MTR-9055 .... N84-30154 #

NADC-82025-60 .... N84-29868 #

NAE-AN-19 .... N84-29855 #

NAS 1.15:58261 .... N84-30684* #
NAS 1.15:77462 .... N84-30222* #
NAS 1.15:83569 .... N84-29870* #
NAS 1.15:83726 .... N84-30294* #
NAS 1.15:83727 .... N84-30072* #
NAS 1.15:83731 .... N84-30223* #
NAS 1.15:83734 .... N84-30224* #
NAS 1.15:83735 .... N84-30329* #
NAS 1.15:83736 .... N84-29878* #
NAS 1.15:83739 .... N84-30528* #
NAS 1.15:83740 .... N84-30293* #
NAS 1.15:83741 .... N84-29876* #
NAS 1.15:83749 .... N84-30147* #
NAS 1.15:83753 .... N84-30273* #
NAS 1.15:83759 .... N84-30146* #
NAS 1.15:85509 .... N84-31047* #
NAS 1.15:85816 .... N84-30014* #
NAS 1.15:85825 .... N84-30331* #
NAS 1.15:85831 .... N84-29864* #
NAS 1.15:85833 .... N84-29897* #
NAS 1.15:85900 .... N84-29879* #
NAS 1.15:85901 .... N84-29884* #
NAS 1.15:85903 .... N84-29885* #
NAS 1.15:85969 .... N84-29857* #
NAS 1.15:85977 .... N84-30225* #
NAS 1.15:85982 .... N84-30887* #
NAS 1.15:85985 .... N84-30226* #
NAS 1.15:85995 .... N84-30510* #
NAS 1.15:86041 .... N84-29863* #
NAS 1.15:86077 .... N84-31069* #
NAS 1.15:86099 .... N84-31079* #
NAS 1.15:86123 .... N84-30455* #
NAS 1.15:86124 .... N84-30962* #
NAS 1.15:86129 .... N84-30433* #
NAS 1.15:86129-VOL-1-PT-1 .... N84-30450* #
NAS 1.15:86256 .... N84-29968* #
NAS 1.15:86257 .... N84-29883* #
NAS 1.15:86258 .... N84-29847* #
NAS 1.15:86266 .... N84-30330* #
NAS 1.15:86275 .... N84-29871* #
NAS 1.15:86285 .... N84-30566* #
NAS 1.15:86654 .... N84-30664* #
NAS 1.21:7011(261) N84-30683*
NAS 1.26:3791 .... N84-29854* #
NAS 1.26:3800 .... N84-30328* #
NAS 1.26:3802 .... N84-29888* #
NAS 1.26:3807 .... N84-30801* #
NAS 1.26:3811 .... N84-29853* #
NAS 1.26:162049 .... N84-30015* #
NAS 1.26:168005 .... N84-29875* #
NAS 1.26:171118 .... N84-30334* #
NAS 1.26:171119 .... N84-30529* #
NAS 1.26:171123 .... N84-29902* #
NAS 1.26:172211 .... N84-29978* #
NAS 1.26:172350 .... N84-29901* #
NAS 1.26:172357 .... N84-30888* #
NAS 1.26:172386 .... N84-30886* #
NAS 1.26:172395 .... N84-30816* #
NAS 1.26:172396 .... N84-30817* #
NAS 1.26:172397 .... N84-30818* #
NAS 1.26:172398 .... N84-29852* #
NAS 1.26:172399 .... N84-30800* #
NAS 1.26:172411 .... N84-29903* #
NAS 1.26:173800 .... N84-30808* #
NAS 1.26:173820 .... N84-30145* #
NAS 1.26:173825 .... N84-31068* #
NAS 1.26:173827 .... N84-31066* #
NAS 1.26:173828 .... N84-30013* #
NAS 1.26:173829 .... N84-29851* #
NAS 1.26:173833 .... N84-30274* #
NAS 1.26:173834 .... N84-30595* #
NAS 1.26:173835 .... N84-30511* #
NAS 1.26:173842 .... N84-30799* #
NAS 1.26:173843 .... N84-30296* #
NAS 1.26:174668 .... N84-29877* #
NAS 1.55:2316 .... N84-30665* #

NAS 1.55:2321 .... N84-29969* #
NAS 1.55:2325 .... N84-30475* #
NAS 1.55:2326-VOL-1 .... N84-30359* #
NAS 1.55:2326-VOL-2 .... N84-30360* #

NASA-CP-2316 .... N84-30665* #
NASA-CP-2321 .... N84-29969* #
NASA-CP-2325 .... N84-30475* #
NASA-CP-2326-VOL-1 .... N84-30359* #
NASA-CP-2326-VOL-2 .... N84-30360* #

NASA-CR-3791 .... N84-29854* #
NASA-CR-3800 .... N84-30328* #
NASA-CR-3802 .... N84-29866* #
NASA-CR-3807 .... N84-30601* #
NASA-CR-3811 .... N84-29853* #
NASA-CR-162049 .... N84-30015* #
NASA-CR-168005 .... N84-29875* #
NASA-CR-171118 .... N84-30334* #
NASA-CR-171119 .... N84-30529* #
NASA-CR-171123 .... N84-29902* #
NASA-CR-172211 .... N84-29878* #
NASA-CR-172350 .... N84-29901* #
NASA-CR-172357 .... N84-30698* #
NASA-CR-172388 .... N84-30686* #
NASA-CR-172395 .... N84-30816* #
NASA-CR-172396 .... N84-30817* #
NASA-CR-172397 .... N84-30818* #
NASA-CR-172398 .... N84-29852* #
NASA-CR-172399 .... N84-30600* #
NASA-CR-172411 .... N84-29903* #
NASA-CR-173800 .... N84-30606* #
NASA-CR-173820 .... N84-30145* #
NASA-CR-173825 .... N84-31068* #
NASA-CR-173827 .... N84-31066* #
NASA-CR-173828 .... N84-30013* #
NASA-CR-173829 .... N84-29851* #
NASA-CR-173833 .... N84-30274* #
NASA-CR-173834 .... N84-30595* #
NASA-CR-173835 .... N84-30511* #
NASA-CR-173842 .... N84-30799* #
NASA-CR-173843 .... N84-30296* #
NASA-CR-174668 .... N84-29877* #

NASA-SP-7011(261) N84-30683*

NASA-TM-58261 .... N84-30684* #
NASA-TM-77462 .... N84-30222* #
NASA-TM-83569 .... N84-29870* #
NASA-TM-83726 .... N84-30294* #
NASA-TM-83727 .... N84-30072* #
NASA-TM-83731 .... N84-30223* #
NASA-TM-83734 .... N84-30224* #
NASA-TM-83735 .... N84-30329* #
NASA-TM-83736 .... N84-29878* #
NASA-TM-83739 .... N84-30528* #
NASA-TM-83740 .... N84-30293* #
NASA-TM-83741 .... N84-29876* #
NASA-TM-83749 .... N84-30147* #
NASA-TM-83753 .... N84-30273* #
NASA-TM-83759 .... N84-30146* #
NASA-TM-85509 .... N84-31047* #
NASA-TM-85816 .... N84-30014* #
NASA-TM-85825 .... N84-30331* #
NASA-TM-85831 .... N84-29864* #
NASA-TM-85833 .... N84-29897* #
NASA-TM-85900 .... N84-29879* #
NASA-TM-85901 .... N84-29884* #
NASA-TM-85903 .... N84-29885* #
NASA-TM-85969 .... N84-29857* #
NASA-TM-85977 .... N84-30225* #
NASA-TM-85982 .... N84-30687* #
NASA-TM-85985 .... N84-30226* #
NASA-TM-85995 .... N84-30510* #
NASA-TM-86041 .... N84-29863* #
NASA-TM-86077 .... N84-31069* #
NASA-TM-86099 .... N84-31079* #
NASA-TM-86123 .... N84-30455* #
NASA-TM-86124 .... N84-30962* #
NASA-TM-86129 .... N84-30433* #
NASA-TM-86129-VOL-1-PT-1 .... N84-30450* #
NASA-TM-86256 .... N84-29868* #
NASA-TM-86257 .... N84-29883* #
NASA-TM-86258 .... N84-29847* #
NASA-TM-86266 .... N84-30330* #
NASA-TM-86275 .... N84-29871* #
NASA-TM-86285 .... N84-30568* #
NASA-TM-86654 .... N84-30664* #

NAVAIR-50-1C-538 .... N84-30627 #

NBS-BSS-160 .... N84-30139 #

NBS-GCR-83-447 .... N84-30140 #

NBS-SP-500-114 .... N84-30740 #

NBS-SP-500-115 .... N84-30739 #

NBSIR-83-2801 .... N84-30011 #
NBSIR-83-2802-PT-2 .... N84-30100 #
NBSIR-84-2817 .... N84-29859 #
NBSIR-84-2836 .... N84-31016 #
NBSIR-84-3002 .... N84-30171 #

NCAR/AR-83 .... N84-30621 #

NCAR/CT-78 .... N84-30592 #

NCAR/TN-229 .... N84-31075 #
NCAR/TN-231 .... N84-30593 #

NHK-LABS-NOTE-297 .... N84-30175 #
NHK-LABS-NOTE-299 .... N84-30174 #

NIMH-83-403 .... N84-30701 #

NIPER-134-PPS-84/2 .... N84-30106 #

NLR-MP-82034-U .... N84-30351 #
NLR-MP-83027-U .... N84-30791 #
NLR-MP-83029-U .... N84-30253 #
NLR-MP-83052-U .... N84-29869 #
NLR-MP-83060-U .... N84-30898 #

NLR-TR-81139-U .... N84-30216 #
NLR-TR-82123-U .... N84-29891 #
NLR-TR-82134-U .... N84-29886 #
NLR-TR-83031-U .... N84-29892 #
NLR-TR-83099-U .... N84-30097 #

NMI-R177 .... N84-30626

NOAA-DR-ERL-WPL-4-PT-2 .... N84-30637 #

NOAA-NWS-CRCP-14 .... N84-30603 #

NOAA-NWS-ERCP-17 .... N84-30616 #
NOAA-NWS-ERCP-18 .... N84-30617 #
NOAA-NWS-ERCP-19 .... N84-30738 #

NOAA-S/T-84-114 .... N84-30795 #

NOAA-TM-ERL-ARL-126 .... N84-31070 #

NOAA-TM-NESDIS-6 .... N84-30571 #

NOAA-84031501 .... N84-30623 #
NOAA-84032301 .... N84-30616 #
NOAA-84032302 .... N84-30617 #
NOAA-84032305-PT-1 .... N84-31073 #
NOAA-84032306-PT-2 .... N84-31074 #
NOAA-84040301 .... N84-30795 #
NOAA-84040302 .... N84-30622 #
NOAA-84041304 .... N84-30551 #
NOAA-84041305 .... N84-30618 #
NOAA-84041802 .... N84-30638 #
NOAA-84041901 .... N84-30619 #
NOAA-84041904-PT-2 .... N84-30637 #
NOAA-84041905 .... N84-31070 #
NOAA-84043005-PT-1 .... N84-31076 #
NOAA-84043006-PT-2 .... N84-31077 #
NOAA-84043011 .... N84-30603 #
NOAA-84043012 .... N84-30554 #
NOAA-84050301 .... N84-31078 #
NOAA-840430010 .... N84-30738 #

NOAA/TM-ERL-ESG-4 .... N84-30623 #

NOAA/TM/NOS/CGS-1 .... N84-30795 #

NOAA/TR-NWS-37 .... N84-30619 #

NOTA-INTERNA-820 .... N84-30169 #

NPL-DITC-38/84 .... N84-30143

NPL-DMA(A)70 .... N84-30292

NPRDC-TR-84-43 .... N84-30697 #

NPS55-84-002 .... N84-30160 #
NPS55-84-011 .... N84-30629 #
NPS55-84-012 .... N84-30632 #
NPS63-84-003 .... N84-30631 #
NPS69-84-004 .... N84-30233 #

NRC-33184 .... N84-29855 #

NRL-MR-5213 .... N84-30724 #
NRL-MR-5332 .... N84-30152 #
NRL-MR-5337 .... N84-30629 #
NRL-MR-5340 .... N84-30775 #
NRL-MR-5358 .... N84-30153 #
NRL-MR-5364 .... N84-30771 #
NRL-MR-5380 .... N84-30230 #

NRL-8797 .... N84-30149 #

NSF-83-1 .... N84-31061 #
NSF-83-5 .... N84-31040 #
NSF-83-319-VOL-32 .... N84-31046 #
NSF-83-320-VOL-31 .... N84-31045 #

NSF/CEE-83020 .... N84-30357 #
NSF/CEE-83031 .... N84-30358 #
NSF/CEE-83032 .... N84-30343 #
NSF/CEE-83035 .... N84-30137 #
NSF/CEE-83036 .... N84-30355 #
NSF/CEE-83037 .... N84-30136 #
NSF/CEE-84003 .... N84-30356 #

NSF/CPE-83011 .... N84-30082 #

NTIA-REPORT-84-145 .... N84-30170 #

NTIA-84-142 .... N84-30173 #
NTIA-84-144 .... N84-31060 #

NW-84-3 .... N84-30189 #

NWC-TP-6508 .... N84-29882 #

NYERDA-83-16 .... N84-30530 #

OIT/FSTC-83/284 .... N84-30797 #
OIT/FSTC-83/290 .... N84-30798 #
OIT/FSTC-83/303 .... N84-30796 #
OIT/FSTC-83/321 .... N84-30794 #
OIT/FSTC-83/325 .... N84-30735 #
OIT/FSTC-84/151 .... N84-30734 #

ONERA-RT-6/3521-M .... N84-29980 #

ONR-8405 .... N84-31050 #

ONRL-R-8-84 .... N84-30179 #

ORNL-SUB-79-24712/3 .... N84-30239 #

ORNL-TR-5118 .... N84-30934 #

ORNL-6002 .... N84-31055 #
ORNL-6033 .... N84-30166 #

ORNL/SUB-78-7229/5 .... N84-30131 #

ORNL/TM-7378 .... N84-29996 #
ORNL/TM-9112 .... N84-30897 #
ORNL/TM-9156 .... N84-30944 #

ORO-5126-207 .... N84-30926 #

OSU-ONR-TR-84-3 .... N84-30828 #
OSU-ONR-TR-84-5 .... N84-30823 #

OT-O-82100 .... N84-30626

OTA-TM-ISC-20 .... N84-30520 #

OTA-TM-STI-14 .... N84-29905 #

OTA-0-206 .... N84-30561 #

OWRT-A-091-CONN(1) .... N84-30674 #
OWRT-A-099-ARIZ(1) .... N84-30527 #

OWRT-C-10105-V(1466)(1) .... N84-30526 #

PAR-84-13 .... N84-30725 #

PA09746/RAS:R-9746 .... N84-30334* #

PB83-147678 .... N84-30793 #
PB84-159672 .... N84-30527 #
PB84-160777 .... N84-30520 #
PB84-163146 .... N84-30674 #
PB84-169382 .... N84-30526 #
PB84-171172 .... N84-30140 #
PB84-174325 .... N84-30616 #
PB84-174333 .... N84-30617 #
PB84-175918 .... N84-30561 #
PB84-176759 .... N84-30011 #
PB84-177393 .... N84-30623 #
PB84-177849 .... N84-30525 #
PB84-178292 .... N84-30172 #
PB84-178557 .... N84-30319 #
PB84-178847 .... N84-30139 #
PB84-178870 .... N84-30098 #

PB84-178979 N84-30099 #
PB84-179802 N84-30622 #
PB84-179811 N84-30625 #
PB84-179829 N84-30618 #
PB84-180009 N84-30521 #
PB84-180124 N84-30719 #
PB84-180140 N84-30701 #
PB84-180215 N84-30794 #
PB84-180231 N84-30734 #
PB84-180249 N84-30798 #
PB84-180280 N84-30636 #
PB84-180413 N84-30135 #
PB84-180603 N84-30271 #
PB84-180611 N84-31073 #
PB84-180629 N84-31074 #
PB84-180793 N84-30624 #
PB84-180892 N84-30795 #
PB84-181106 N84-30552 #
PB84-181296 N84-30522 #
PB84-181361 N84-30796 #
PB84-181379 N84-30735 #
PB84-181387 N84-30797 #
PB84-181437 N84-29905 #
PB84-181650 N84-29893 #
PB84-181767 N84-30695 #
PB84-181957 N84-30560 #
PB84-181999 N84-30138 #
PB84-182104 N84-30170 #
PB84-182443 N84-30615 #
PB84-182757 N84-30619 #
PB84-182815 N84-30591 #
PB84-182906 N84-30620 #
PB84-183219 N84-31060 #
PB84-183250 N84-30523 #
PB84-183292 N84-31070 #
PB84-183482 N84-30638 #
PB84-183581 N84-30621 #
PB84-183599 N84-30100 #
PB84-183664 N84-30637 #
PB84-183680 N84-30592 #
PB84-184150 N84-31075 #
PB84-184613 N84-30553 #
PB84-184738 N84-30173 #
PB84-184795 N84-30593 #
PB84-184894 N84-30550 #
PB84-184951 N84-30530 #
PB84-185214 N84-30562 #
PB84-185222 N84-30559 #
PB84-185230 N84-30551 #
PB84-185941 N84-30603 #
PB84-186147 N84-30554 #
PB84-187723 N84-30217 #
PB84-187731 N84-30219 #
PB84-187749 N84-30218 #
PB84-187939 N84-30639 #
PB84-187947 N84-30640 #
PB84-187954 N84-30641 #
PB84-188671 N84-31077 #
PB84-188689 N84-31076 #
PB84-188697 N84-31078 #
PB84-188770 N84-31044 #
PB84-189257 N84-30556 #
PB84-189521 N84-30101 #
PB84-189554 N84-30272 #
PB84-189596 N84-31045 #
PB84-189604 N84-31046 #
PB84-189836 N84-30737* #
PB84-189885 N84-30738 #
PB84-190628 N84-30257 #
PB84-190636 N84-30171 #
PB84-190735 N84-30012 #
PB84-190982 N84-30524 #
PB84-192012 N84-30358 #
PB84-192020 N84-30343 #
PB84-192178 N84-30137 #
PB84-192186 N84-30136 #
PB84-192210 N84-30357 #
PB84-192749 N84-30356 #
PB84-192848 N84-30355 #
PB84-192905 N84-30062 #
PB84-193234 N84-31061 #
PB84-193747 N84-30354 #
PB84-194206 N84-30563 #
PB84-194737 N84-30590 #
PB84-194919 N84-30799* #

PFC/CP-84-6 N84-30982 #
PFC/CP-84-7 N84-30981 #

PFC/RR-84-3 N84-30983 #
PFC/RR-84-5 N84-30979 #

PHL-1984-05 N84-30214 #
PHL-1984-12-PT-2 N84-31043 #

PML-1984-5 N84-30316 #

PNL-SA-11565 N84-30730 #
PNL-SA-11624 N84-30025 #
PNL-SA-12058 N84-31041 #
PNL-SA-12081 N84-30547 #
PNL-SA-12116 N84-30058 #
PNL-SA-12192 N84-30323 #

PNL-4709 N84-30604 #
PNL-4945 N84-30250 #
PNL-5013 N84-30030 #
PNL-5061 N84-29967 #

PPSP/PPRP-86 N84-30553 #
PPSP/PPRP-87 N84-30636 #

PR-3 N84-30548 #
PR-4 N84-30703 #

PREPRINT-35 N84-29896 #
PREPRINT-356 N84-30843 #
PREPRINT-357 N84-30937 #
PREPRINT-358 N84-30938 #

PTR-84-4 N84-30274* #

QL-2 N84-30105 #

QR-6 N84-30109 #
QR-7 N84-30241 #

R-989 N84-30157 #
R-990 N84-30849 #
R-991 N84-30077 #
R-992 N84-31012 #
R-993 N84-30181 #
R-994 N84-30182 #
R-996 N84-30822 #
R-997 N84-30824 #
R-998 N84-30158 #

RADC-TR-83-285 N84-31013 #
RADC-TR-84-6 N84-30183 #
RADC-TR-84-18 N84-30951 #
RADC-TR-84-38 N84-30188 #
RADC-TR-84-51 N84-29988 #
RADC-TR-84-91 N84-30159 #

REPT-4 N84-30335 #
REPT-4-84 N84-30144
REPT-80 N84-31032 #
REPT-81 N84-30846 #
REPT-82 N84-30861 #
REPT-84-SM-2 N84-30340 #
REPT-609 N84-30569 #
REPT-0002AC N84-31010 #
REPT-1080-33-VOL-4 N84-30774 #
REPT-1080-34 N84-30766 #
REPT-1514-2 N84-30310 #
REPT-8309-38 N84-30256 #

RES/DEVELOP-SR-3 N84-30300 #

RFP-3275 N84-30001 #

RR-247-PT-1 N84-30134 #
RR-248 N84-30733 #
RR-250 N84-30852 #
RR-251-PT-1 N84-30844 #
RR-252-PT-2 N84-30845 #

S-537 N84-30884* #

S/T-REPT-VOL-1-NO-1 N84-30060 #
S/T-REPT-VOL-1-NO-2 N84-30254 #
S/T-REPT-VOL-1-NO-3 N84-30718 #
S/T-REPT-VOL-1-NO-4 N84-30352 #
S/T-REPT-VOL-1-NO-5 N84-30558 #

SACLANTCEN-SM-170 N84-30512 #

SACLANTCEN-SR-79 N84-30890 #

SAI-84-1572 N84-30840 #
SAI-84-3033/PRI-77 N84-30999 #
SAI-84/1093 N84-30228 #
SAI-84/1554 N84-30572 #

SAND-83-1522C N84-30896 #
SAND-83-1652 N84-30161 #
SAND-83-1670 N84-30788 #
SAND-83-1690C N84-30046 #
SAND-83-1766C N84-30346 #
SAND-83-1949C N84-30095 #
SAND-83-2233C N84-30602 #
SAND-83-2254C N84-30211 #
SAND-83-2287C N84-30945 #
SAND-83-2306C N84-30199 #
SAND-83-2506 N84-30342 #
SAND-83-2573 N84-30055 #
SAND-83-2576 N84-30002 #
SAND-83-2641C N84-30997 #
SAND-83-2653C N84-29997 #
SAND-83-2670 N84-30094 #
SAND-84-0081C N84-30532 #
SAND-84-0281 N84-30782 #
SAND-84-0302 N84-30834 #
SAND-84-0311 N84-30778 #
SAND-84-0397 N84-30306 #
SAND-84-0406C N84-31017 #
SAND-84-0432 N84-30348 #
SAND-84-0448 N84-30842 #
SAND-84-0477 N84-31007 #
SAND-84-0510 N84-30091 #
SAND-84-0581C N84-31054 #
SAND-84-0685C N84-30206 #
SAND-84-0765C N84-30785 #
SAND-84-0919C N84-31053 #
SAND-84-1173C N84-30007 #
SAND-84-7104 N84-30198 #
SAND-84-8221 N84-30036 #

SBRC-40497 N84-31010 #

SC5329.8FR N84-30021 #

SERI-STR-211-2092 N84-30084 #

SERI/CP-231-2075 N84-30536 #

SERI/SP-281-1973 N84-31057 #

SERI/STR-211-2230 N84-31026 #
SERI/STR-211-2279 N84-30537 #

SERI/TP-252-2030 N84-30534 #
SERI/TP-253-2079 N84-30543 #

SERI/TR-254-1687 N84-30605 #
SERI/TR-255-1505 N84-30535 #

SGD-473-PT-1 N84-31073 #
SGD-473-PT-2 N84-31074 #
SGD-474-PT-1 N84-31076 #
SGD-474-PT-2 N84-31077 #
SGD-474-SUPPL N84-31078 #

SIO-REF-84-6 N84-30954 #

SLAC-PUB-3221 N84-30913 #

SLAC/AP-21 N84-30287 #

SR-2 N84-30186 #
SR-3 N84-30599 #
SR-3 N84-30954 #

SU-GL-3716 N84-31011 #

SU-PRI-TR-37 N84-30246 #

SU-SLAC-CN-233 N84-30176 #
SU-SLAC-CN-235 N84-30924 #
SU-SLAC-CN-236 N84-30207 #

SU-SLAC-PUB-3285 N84-30907 #

SU-SLAC/AP-13 N84-30209 #
SU-SLAC/AP-16 N84-31030 #

SU-TR-344 N84-30848 #

TDCK-78986 N84-30214 #
TDCK-79062 N84-30168 #
TDCK-79065 N84-30315 #
TDCK-79067 N84-30213 #
TDCK-79068 N84-31043 #
TDCK-79153 N84-30316 #
TDCK-79159 N84-30167 #

TR-12 N84-29981 #
TR-13 N84-29982 #
TR-14 N84-30016 #
TR-14 N84-30819 #
TR-16 N84-29983 #
TR-19 N84-30075 #
TR-20 N84-30074 #
TR-27 N84-29990 #
TR-29 N84-29987 #
TR-30 N84-29989 #
TR-31 N84-29985 #
TR-32 N84-29986 #
TR-33 N84-29984 #

TR-61 .... N84-30340 #
TR-83-016 .... N84-30177 #
TR-83-423 .... N84-29868 #
TR-163 .... N84-30184 #
TR-164 .... N84-30187 #
TR-345 .... N84-30850 #

TT-8402 .... N84-30353 #

TVA/OP/EDT-83/33 .... N84-31065 #
TVA/OP/EDT-83/35 .... N84-30206 #

UAH-RR-407 .... N84-29902* #

UAH-367 .... N84-30218 #
UAH-368 .... N84-30219 #
UAH-376 .... N84-30217 #
UAH-393 .... N84-30550 #

UCB/EERC-83/16 .... N84-30357 #
UCB/EERC-83/18 .... N84-30358 #
UCB/EERC-83/19 .... N84-30343 #
UCB/EERC-83/22 .... N84-30137 #
UCB/EERC-83/23 .... N84-30355 #
UCB/EERC-83/24 .... N84-30136 #

UCB/RP/84/A1021 .... N84-30024 #

UCD-472-128 .... N84-30672 #

UCID-18852-REV-2 .... N84-30605 #
UCID-19889-REV-1 .... N84-30729 #
UCID-19925-REV-1 .... N84-30164 #
UCID-20002 .... N84-30047 #
UCID-20026 .... N84-30932 #
UCID-20034 .... N84-30113 #
UCID-20045 .... N84-30247 #
UCID-20061 .... N84-30197 #
UCID-20062 .... N84-31071 #
UCID-20075 .... N84-30162 #
UCID-20088 .... N84-30581 #
UCID-30183-REV-1 .... N84-30835 #
UCID-30184-REV-1 .... N84-30789 #

UCLA/PPG-765-VOL-1 .... N84-30969 #

UCRL-15599 .... N84-31021 #
UCRL-15606 .... N84-30731 #
UCRL-53444 .... N84-30587 #
UCRL-53504 .... N84-30045 #
UCRL-53525 .... N84-30779 #
UCRL-53528 .... N84-30608 #
UCRL-83604-REV-1 .... N84-30606 #
UCRL-88924 .... N84-30909 #
UCRL-89002 .... N84-31018 #
UCRL-89165 .... N84-30732 #
UCRL-89474 .... N84-30607 #
UCRL-89687 .... N84-30104 #
UCRL-89723 .... N84-29996 #
UCRL-89743-REV-1 .... N84-31023 #
UCRL-89774 .... N84-30026 #
UCRL-89915 .... N84-30720 #
UCRL-89964-REV-1 .... N84-30577 #
UCRL-90033 .... N84-30288 #
UCRL-90089 .... N84-30283 #
UCRL-90142 .... N84-30132 #
UCRL-90234 .... N84-30244 #
UCRL-90351 .... N84-30727 #
UCRL-90378 .... N84-30107 #
UCRL-90425 .... N84-30991 #
UCRL-90509 .... N84-30344 #
UCRL-90577 .... N84-30312 #
UCRL-90687 .... N84-30921 #

UDR-TR-83-37 .... N84-29856 #
UDR-TR-83-137-VOL-1 .... N84-30320 #

UILU-ENG-83-2209 .... N84-30821 #
UILU-ENG-83-2210 .... N84-30157 #
UILU-ENG-83-2211 .... N84-30849 #
UILU-ENG-83-2212 .... N84-30077 #
UILU-ENG-83-2213 .... N84-31012 #
UILU-ENG-83-2214 .... N84-30181 #
UILU-ENG-83-2215 .... N84-30182 #
UILU-ENG-83-2216 .... N84-30825 #
UILU-ENG-83-2217 .... N84-30822 #
UILU-ENG-83-2218 .... N84-30824 #
UILU-ENG-83-2219 .... N84-30158 #
UILU-ENG-83-2227 .... N84-30723 #
UILU-ENG-84-2552 .... N84-30145* #

UIO-SR-84-02 .... N84-30588 #

US-PATENT-APPL-SN-473180 .... N84-30308 #
US-PATENT-APPL-SN-491134 .... N84-30242 #
US-PATENT-APPL-SN-491639 .... N84-30086 #
US-PATENT-APPL-SN-494484 .... N84-29979 #
US-PATENT-APPL-SN-494487 .... N84-29999 #
US-PATENT-APPL-SN-495386 .... N84-30977 #
US-PATENT-APPL-SN-495668 .... N84-30263 #
US-PATENT-APPL-SN-498099 .... N84-30090 #
US-PATENT-APPL-SN-500102 .... N84-30037 #
US-PATENT-APPL-SN-500105 .... N84-30942 #
US-PATENT-APPL-SN-501312 .... N84-30204 #
US-PATENT-APPL-SN-501313 .... N84-30264 #
US-PATENT-APPL-SN-503128 .... N84-30085 #
US-PATENT-APPL-SN-503373 .... N84-30201 #
US-PATENT-APPL-SN-504905 .... N84-30916 #
US-PATENT-APPL-SN-505011 .... N84-30307 #
US-PATENT-APPL-SN-507188 .... N84-30267 #
US-PATENT-APPL-SN-509555 .... N84-30959 #
US-PATENT-APPL-SN-509758 .... N84-30261 #
US-PATENT-APPL-SN-513523 .... N84-30205 #
US-PATENT-APPL-SN-513557 .... N84-30266 #
US-PATENT-APPL-SN-517474 .... N84-30039 #
US-PATENT-APPL-SN-517476 .... N84-30918 #
US-PATENT-APPL-SN-517477 .... N84-30044 #
US-PATENT-APPL-SN-517536 .... N84-30040 #
US-PATENT-APPL-SN-518243 .... N84-30347 #
US-PATENT-APPL-SN-519941 .... N84-30038 #
US-PATENT-APPL-SN-521497 .... N84-31019 #
US-PATENT-APPL-SN-523556 .... N84-30041 #
US-PATENT-APPL-SN-526765 .... N84-30345 #
US-PATENT-APPL-SN-526767 .... N84-30243 #
US-PATENT-APPL-SN-528278 .... N84-30856 #
US-PATENT-APPL-SN-528285 .... N84-30262 #
US-PATENT-APPL-SN-528509 .... N84-30281 #
US-PATENT-APPL-SN-535979 .... N84-30262 #
US-PATENT-APPL-SN-538889 .... N84-30295 #
US-PATENT-APPL-SN-539011 .... N84-30857 #
US-PATENT-APPL-SN-539013 .... N84-30895 #
US-PATENT-APPL-SN-539366 .... N84-30000 #
US-PATENT-APPL-SN-539369 .... N84-30265 #
US-PATENT-APPL-SN-581831 .... N84-30319 #

USAAVSCOM-TR-84-C-1 .... N84-29870* #
USAAVSCOM-TR-84-C-10 .... N84-30294* #
USAAVSCOM-TR-84-C-11 .... N84-30293* #

USAFA-TR-84-5 .... N84-29849 #

USAFSAM-TR-84-7 .... N84-30669 #
USAFSAM-TR-84-11 .... N84-30670 #

USCG-D-17-84 .... N84-30156 #

USCIPI-1100 .... N84-30956 #

USCSC-TR-01-84 .... N84-30257 #

USGS-GD-84-002 .... N84-30591 #

USGS-OFR-83-535 .... N84-30610 #
USGS-OFR-84-114 .... N84-30584 #

USGS-WRD-AL-82 .... N84-30523 #

USGS/WDR/AR-82-1 .... N84-30522 #

USGS/WDR/MA-RI-82-1 .... N84-30521 #

USGS/WRD/HD-83/010 .... N84-30522 #
USGS/WRD/HD-84-008 .... N84-30523 #
USGS/WRD/HD-84/013 .... N84-30521 #

USIP-84-04 .... N84-30061 #
USIP-84-06 .... N84-30009 #
USIP-84-08 .... N84-30940 #

UTD-22831-961 .... N84-30968 #

UTEC-83-84004 .... N84-30670 #
UTEC-84-028 .... N84-31027 #

UTRC/R84-915797-4 .... N84-30019 #

VPI-E-84-17 .... N84-30354 #

VPI-HFL-83-3 .... N84-30716 #

VTT-16 .... N84-30318 #

WES-TM-6-412-4 .... N84-30335 #

WES/MP/HL-84-2 .... N84-30634 #

WES/TR/HL-E-84-6 .... N84-30130 #

WES/TR/Y-84-1 .... N84-30515 #

WHOI-84-4 .... N84-30891 #

WMO-628 .... N84-30614 #

WSRL-0327-TR .... N84-29900 #

WTHD-161 .... N84-30703 #

YALEU/DCS/TR-297 .... N84-30833 #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1984—461-597/420

FEDERAL DEPOSITORY LIBRARY PROGRAM

The Federal Depository Library Program provides Government publications to designated libraries throughout the United States. The Regional Depository Libraries listed below receive and retain at least one copy of nearly every Federal Government publication, either in printed or microfilm form, for use by the general public. These libraries provide reference services and inter-library loans; however, they are *not* sales outlets. You may wish to ask your local library to contact a Regional Depository to help you locate specific publications, or you may contact the Regional Depository yourself.

ARKANSAS STATE LIBRARY
One Capitol Mall
Little Rock, AR 72201
(501) 371-2326

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Department
Montgomery, AL 36193
(205) 279-9110, ext. 253

UNIV. OF ALABAMA LIBRARY
Documents Dept.—Box S
University, AL 35486
(205) 348-7369

DEPT. OF LIBRARY, ARCHIVES AND PUBLIC RECORDS
Third Floor—State Cap.
1700 West Washington
Phoenix, AZ 85007
(602) 255-4121

UNIVERSITY OF ARIZONA LIB.
Government Documents Dept.
Tucson, AZ 85721
(602) 626-5233

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 2037
Sacramento, CA 95809
(916) 322-4572

UNIV. OF COLORADO LIB.
Government Pub. Division
Campus Box 184
Boulder, CO 80309
(303) 492-8834

DENVER PUBLIC LIBRARY
Govt. Pub. Department
1357 Broadway
Denver, CO 80203
(303) 571-2131

CONNECTICUT STATE LIBRARY
Government Documents Unit
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971

UNIV. OF FLORIDA LIBRARIES
Library West
Documents Department
Gainesville, FL 32611
(904) 392-0367

UNIV. OF GEORGIA LIBRARIES
Government Reference Dept.
Athens, Ga 30602
(404) 542-8951

UNIV. OF HAWAII LIBRARY
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230

UNIV. OF IDAHO LIBRARY
Documents Section
Moscow, ID 83843
(208) 885-6344

ILLINOIS STATE LIBRARY
Information Services Branch
Centennial Building
Springfield, IL 62706
(217) 782-5185

INDIANA STATE LIBRARY
Serials Documents Section
140 North Senate Avenue
Indianapolis, IN 46204
(317) 232-3686

UNIV. OF IOWA LIBRARIES
Govt. Documents Department
Iowa City, IA 52242
(319) 353-3318

UNIVERSITY OF KANSAS
Doc. Collect—Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

UNIV. OF KENTUCKY LIBRARIES
Govt. Pub. Department
Lexington, KY 40506
(606) 257-3139

LOUISIANA STATE UNIVERSITY
Middleton Library
Govt. Docs. Dept.
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV. LIBRARY
Documents Department
Ruston, LA 71272
(318) 257-4962

UNIVERSITY OF MAINE
Raymond H. Fogler Library
Tri-State Regional Documents Depository
Orono, ME 04469
(207) 581-1680

UNIVERSITY OF MARYLAND
McKeldin Lib.—Doc. Div.
College Park, MD 20742
(301) 454-3034

BOSTON PUBLIC LIBRARY
Government Docs. Dept.
Boston, MA 02117
(617) 536-5400 ext. 226

DETROIT PUBLIC LIBRARY
Sociology Department
5201 Woodward Avenue
Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
P.O. Box 30007
Lansing, MI 48909
(517) 373-0640

UNIVERSITY OF MINNESOTA
Government Pubs. Division
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 373-7813

UNIV. OF MISSISSIPPI LIB.
Documents Department
University, MS 38677
(601) 232-5857

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812
(406) 243-6700

NEBRASKA LIBRARY COMM.
Federal Documents
1420 P Street
Lincoln, NE 68508
(402) 471-2045
In cooperation with University of Nebraska-Lincoln

UNIVERSITY OF NEVADA LIB.
Govt. Pub. Department
Reno, NV 89557
(702) 784-6579

NEWARK PUBLIC LIBRARY
5 Washington Street
Newark, NJ 07101
(201) 733-7812

UNIVERSITY OF NEW MEXICO
Zimmerman Library
Government Pub. Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
325 Don Gaspar Avenue
Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12230
(518) 474-5563

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Wilson Library
BA/SS Documents Division
Chapel Hill, NC 27515
(919) 962-1321

UNIVERSITY OF NORTH DAKOTA
Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext. 27
(In cooperation with North Dakota State Univ. Library)

STATE LIBRARY OF OHIO
Documents Department
65 South Front Street
Columbus, OH 43215
(614) 462-7051

OKLAHOMA DEPT. OF LIB.
Government Documents
200 NE 18th Street
Oklahoma City, OK 73105
(405) 521-2502

OKLAHOMA STATE UNIV. LIB.
Documents Department
Stillwater, OK 74078
(405) 624-6546

PORTLAND STATE UNIV. LIB.
Documents Department
P.O. Box 1151
Portland, OR 97207
(503) 229-3673

STATE LIBRARY OF PENN.
Government Pub. Section
P.O. Box 1601
Harrisburg, PA 17105
(717) 787-3752

TEXAS STATE LIBRARY
Public Services Department
P.O. Box 12927—Cap. Sta.
Austin, TX 78753
(512) 471-2996

TEXAS TECH UNIV. LIBRARY
Govt. Documents Department
Lubbock, TX 79409
(806) 742-2268

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

UNIVERSITY OF VIRGINIA
Alderman Lib.—Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON STATE LIBRARY
Documents Section
Olympia, WA 98504
(206) 753-4027

WEST VIRGINIA UNIV. LIB.
Documents Department
Morgantown, WV 26506
(304) 293-3640

MILWAUKEE PUBLIC LIBRARY
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 278-3000

ST. HIST LIB. OF WISCONSIN
Government Pub. Section
816 State Street
Madison, WI 53706
(608) 262-4347

WYOMING STATE LIBRARY
Supreme Ct. & Library Bld.
Cheyenne, WY 82002
(307) 777-6344

National Aeronautics and
Space Administration
Code NIT-4
Washington, D.C.
20546

Official Business
Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MAIL

10 1 STAR, 841030 S01/33HU
UNIV OF MICHIGAN
HARLAN HATCHER LIBRARY
DOCUMENTS UNIT SERIALS DIV
ANN ARBOR MI 48109

S

NASA

POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return

n 158
Return